CHAPTER 4

MAINTENANCE OF MISSILES AND MOBILE SUBMARINE SIMULATOR SYSTEMS

OVERVIEW

Describe the maintenance levels and the maintenance required for the various missiles and mobile submarine simulators.

OUTLINE

ASROC Maintenance

Harpoon Maintenance

Tomahawk Maintenance

MOSS Maintenance

In this chapter we will discuss maintenance requirements for ASROC, Harpoon, and Tomahawk missiles. We will also give a description and the maintenance requirements of the Mobile Submarine Simulator Systems (MOSS). This information is written at the knowledge level and no attempt is made to provide instructions for skill performance. To actually perform maintenance on these missiles, you should follow the procedures and observe the safety precautions in the applicable OP, OD, SWOP, or MRC. Chapter 6 of the *Torpedoman's Mate Third Class* rate training manual, NAVEDTRA 10168, contains a description of the components, operation, and capabilities of the various missiles. Before you study this chapter, a review of that material may prove beneficial.

ASROC MISSILE MAINTENANCE

Maintenance of the ASROC missile and support equipment includes servicing, repair, retrofit, overhaul, rework, test and inspection; and replacement of assemblies, components, and parts. Maintenance is performed at organizational, intermediate, and depot level maintenance activities. This maintenance is classified as either preventive or corrective. Preventive maintenance provides for missile readiness and operability, prolongs component reliability, and decreases the need for repair. Additionally, preventive maintenance includes periodic inspection, cleaning, checkout, and adjustment of both the missile and its components. Corrective maintenance includes repair and/or replacement of faulty or malfunctioning missile components.

ORGANIZATIONAL LEVEL MAINTENANCE

ASROC maintenance at the organizational level is concerned with assembled missiles and with standard hand tools required to perform maintenance at this level. Organizational level maintenance is performed on the launching platform. However, this maintenance is limited to the replacement of torpedo nose caps, thrust neutralizers, cable assemblies, contactor adaptor assemblies, and motor fins, and the performance of fire control tests of the missile. If a deficiency cannot be corrected on the firing ship, the missile must be transferred to an intermediate maintenance activity (IMA) for further examination.

INTERMEDIATE LEVEL MAINTENANCE

Intermediate level maintenance is accomplished by destroyer tenders (ADs) and antisubmarine warfare (ASW) facilities. The facilities conduct assembly, turnaround, and disassembly of the missile (rocket-thrown torpedo [RTT]); other portions of this maintenance include the inspection and testing of missile components.

A detailed checkoff list must be used during all missile maintenance operations. *ASROC Missile Description and Instructions for Assembly, Inspection, and Storage,* SW180-AA-MMI-010/2963, provides checkoff lists for assembly, disassembly packaging, unpackaging, inspection, and turnaround of the missile. Detailed checkoff lists may be prepared locally in any acceptable format. Steps may be added or deleted from the list so it will correspond to the level of detail desired. Prepared checkoff lists and their changes and modifications must include all applicable standard inspection procedures (SIP) contained in the *Quality Assurance Test and Inspection Plan (QATIP), 403.* Directives issued by cognizant authorities must be consulted for the preparation and use of locally prepared checkoff lists.

An ASROC missile at an intermediate maintenance activity that was received from a transshipment activity (AE/AOE) maybe reissued without maintenance under the following conditions:

1. The missile did not leave the ship during deployment and has remained in its original container since assembly.
2. The missile container is still serviceable.
3. Missile records show all components are within service life limitations and not limited or restricted from use.
4. A visual inspection determines that the missile is undamaged.
5. A verification of serialized payload components is compatible with missile records.
6. Missile records are properly annotated to reflect verification inspection.

Missile assembly, turnaround, disassembly, inspection, and component tests, when required, must be done by following the procedures contained in *ASROC Missile Description and Instructions for Assembly, Inspection, and Storage,* SW-180-AA-MMI-010/2963. All personnel involved in missile maintenance must be thoroughly indoctrinated and have an understanding of the safety precautions contained in this manual.

Missile Assembly

Before assembling a missile you should verify that components, assembly tools, and equipment are available; that electrical testing of the ignition separation assembly (ISA) has been conducted; that preparation of the missile assembly fixture is completed; that the deflection telescope has been aligned; that periodic inspection of gyroscope test set Mk 484, test cable safety

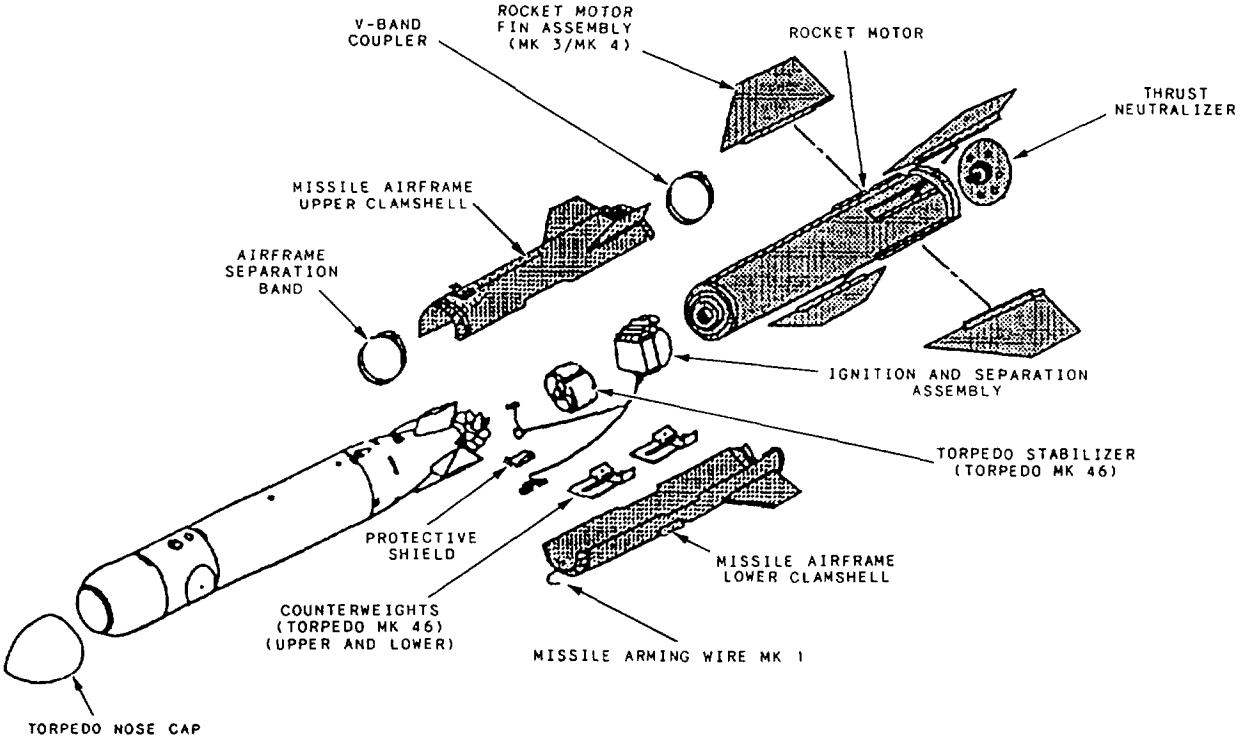


Figure 4-1.-Rocket thrown torpedo (RTT)—exploded view.

assurance tests are complete, and that all equipment is within current periodic calibration requirements.

Figure 4-1 shows the required components for the rocket thrown torpedo (RTT).

The recommended assembly sequence for the RTT is as follows: (refer to figure 4-1 for component identification):

1. Prepare missile airframe.
2. Install counterweights in the airframe.
3. Prepare and install the ignition and separation assembly (ISA).
4. Prepare the torpedo for missile assembly.
5. Attach the stabilizer to the torpedo.
6. Install the payload cable connector to the torpedo.
7. Connect the stabilizer deployment cord to the lower clamshell.
8. Assemble the upper clamshell to the lower clamshell.
9. Assemble the airframe separation band (AFS) to the airframe.
10. Perform continuity test and fault isolation.
11. Assemble the rocket motor fins to the rocket motor.
12. Align the rocket motor with the airframe.
13. Assemble the V-band coupler to the airframe and rocket motor.
14. Check launching lug alignment.
15. Assemble the contactor adaptor assembly to the missile (GMLS Mk 26 designated missiles only).
16. Connect the Mk 1 arming wire to the torpedo.
17. Install the nose cap on the torpedo.
18. Check the vertical and horizontal deflections (fig. 4-2).

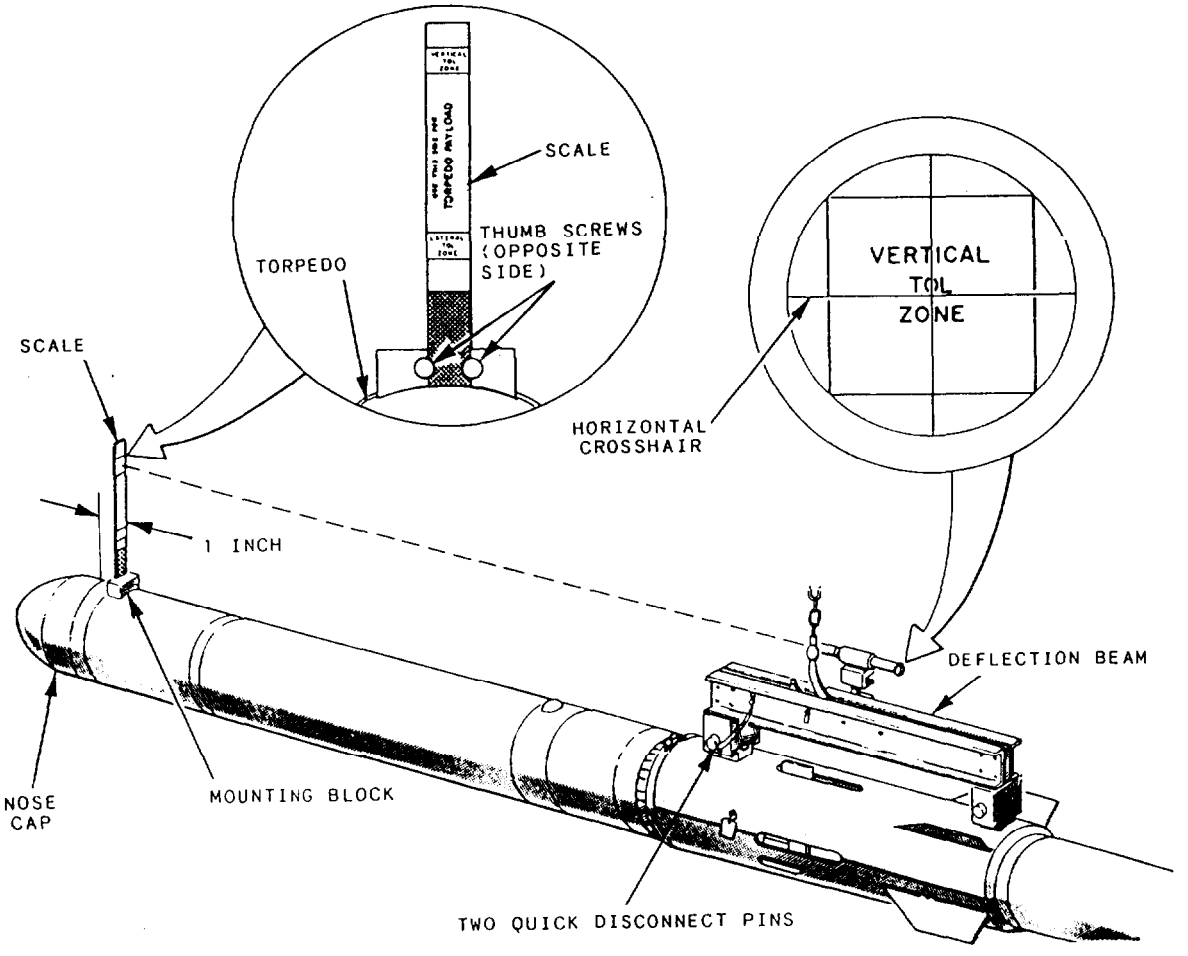


Figure 4-2.-Checking deflection of a rocket thrown torpedo.

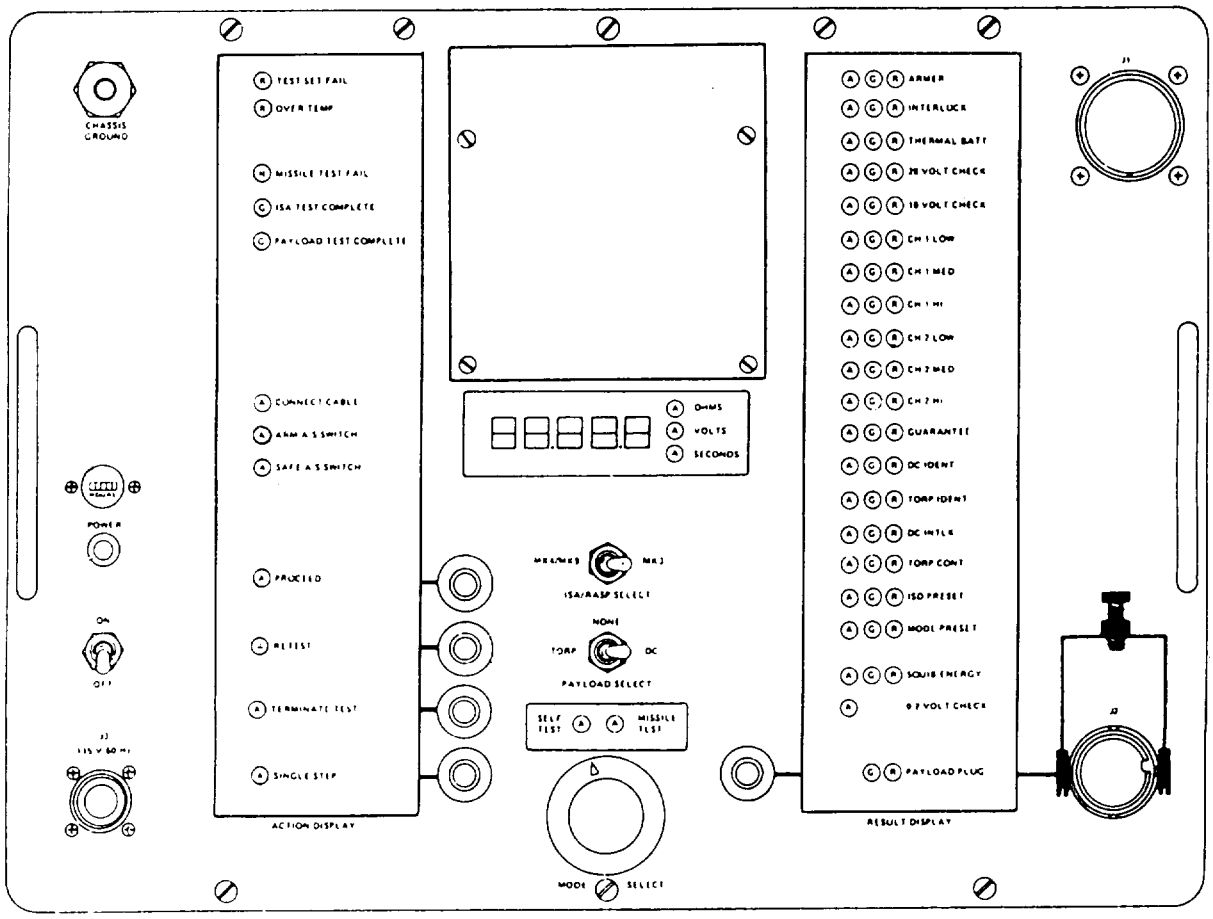


Figure 4-3.-Mk 620 Mod 0 test set.

Missile Turnaround

Missile turnaround is done on fleet return missiles that have sufficient service life remaining for their intended use.

Before missile turnaround, the missile must be unpackaged and inspected. Unpack aging and inspection procedures are contained in SW180-AA-MMI-010/2963.

Missile Disassembly

When a missile has been returned to an assembly facility because of a misfire, expiration of service life, or damage or defects that render the missile unserviceable, it must be disassembled. But before disassembly, the technicians must ensure that service test and handling equipment and standard/special hand tools are available. Equally important is that these equipments are within current calibration and in proper working condition.

Procedures for the disassembly of a missile are essentially the reverse of the assembly procedures. Disassembly procedures of an RTT are contained in SW180-AA-MMI-010/2963.

After disassembly of a missile, all missile components must be inspected for serviceability before they can be used in another missile. A torpedo payload requires a periodic maintenance check after a maximum period of 3 years have elapsed since the last maintenance. The ISA from the missile must be inspected and electrically tested with a hazardous circuit tester and the Mk 620 range and airframe separation programmer (RASP) test set. Figure 4-3 shows the Mk 620 Mod 0 test set.

The hazardous circuit tester is used to check the thermal battery monitoring circuits of the ISA. The Mk 620 mod 0 test set monitors operating voltages in the RASP. It shows the readback time of the programmer functions during a simulated operational test.

Component Replacement and Repair

Component replacement of an assembled missile is limited to and dependent upon the availability of parts at the various activities.

Component replacement on assembled missiles aboard firing ships (AD or ASW facilities) includes the replacement of the torpedo nose cap, thrust neutralizer, cable assembly, contactor adaptor assembly, and the motor fins.

Replacement of other components that require missile disassembly are the torpedo, ISA, rocket motor, motor V-band, airframe, airframe band, counterweights, torpedo stabilizer, and the Mk 1 arming wire.

Component replacement performed by ASROC personnel for the torpedo aboard an AD or at an ASW facility is limited to the removal and replacement of the propeller setscrew, installation of spacers on the payload receptacle as required, and the removal and replacement of the seawater battery when necessary.

The repair of components in an assembled missile is limited to the removal of corrosion, repair of minor surface imperfections, and touch-up of exterior paint. After disassembly, the repair of missile components include the application of surface treatments, recementing of certain components, and complete refinishing of externally painted surfaces. The following general guidelines should be used when missile components must be repaired:

1. The missile should be disassembled only to the stage where the defective component is accessible.
2. The defective component must be inspected to determine the extent of repair necessary.
3. Repair of components must be made according to procedures listed or referenced in SW180-AA-MMI-010/2963.

Damaged unpainted aluminum surfaces, painted surfaces, unpainted and unplated/plated steel surfaces must be repaired and refinished. A corrosion preventive compound must then be applied to the affected area. If the surface of a component is scratched or corroded to the extent that the base metal has been damaged, the component must be sent to a designated overhaul activity. Component repairs that are authorized to be made by ASROC personnel at an IMA include the following:

1. The Mk 46 torpedo-maintenance (repair) procedures that can be performed aboard an AD or at an ASW IMA facility are limited to refinishing of corroded or scratched surfaces, cleaning the transducer face, and applying wax to the exterior surfaces.

2. The repair of the missile airframe consists of repairing minor damage to launching and restraining lugs. The repair of any launching or restraining lug is limited to dressing down, to the existing lug surface—any raised metal resulting from dents, nicks, scratches, corrosion, or scores. After repair, alodine aluminum lugs and treat with dry film lubricant. Following repair, inspect the surface for imperfections that may exceed the following conditions. These conditions will result in the rejection of the airframe:

- Dents, nicks, corrosive pits: 1/32-inch deep by 1/4 inch wide.
- Scratches, scores: 1/32-inch deep by any length or position on the weapon.

3. The repair of the torpedo nose cap is limited to mending cracks in the shell skirt area, removing flash (mold imperfections) and sharp edges from foam quadrants, and rebonding fiberglass spring clips inside the shell.

4. The repair of the torpedo stabilizer is limited to the replacement of loose or missing stitching that secures the bag harness to the envelope and the refinishing of metal surfaces.

5. The repair of the rocket motor is limited to the refinishing of minor scratched surfaces, areas of rust, or corroded surfaces.

6. The repair of the ISA is limited to touch-up and refinishing of scratched or corroded metal surfaces, repair of damage to explosive component cable insulation jackets, release of stuck pins in the payload connector, replacement of the three rubber channels on the housing base plate and replacement of ISA Mk 4 components.

7. The repair of the cable assembly involves the application of a protective coat of varnish on cables with aluminum connectors (some cables have stainless steel connectors and do not require a protective coating). The removal of corrosion; the cleaning of the corroded or damaged surfaces, and the application of corrosion preventive compound to clean surfaces are part of this repair.

LOGISTICS SUPPORT

Logistics support for the ASROC missile is directed by the Naval Sea Systems Command (NAVSEASYSCOM) and is provided as follows:

1. Logistics support for the torpedo payload and associated test and handling equipment for organizational, intermediate, and depot level maintenance is provided by the NAVSEASYSCOM and Ship's Parts Control Center (SPCC).

2. The ASROC inventory control manager located at SPCC, is responsible for the inventory control of the missile components (4T cognizant). Service test equipment (STE) and spare parts logistics support for the missile components is

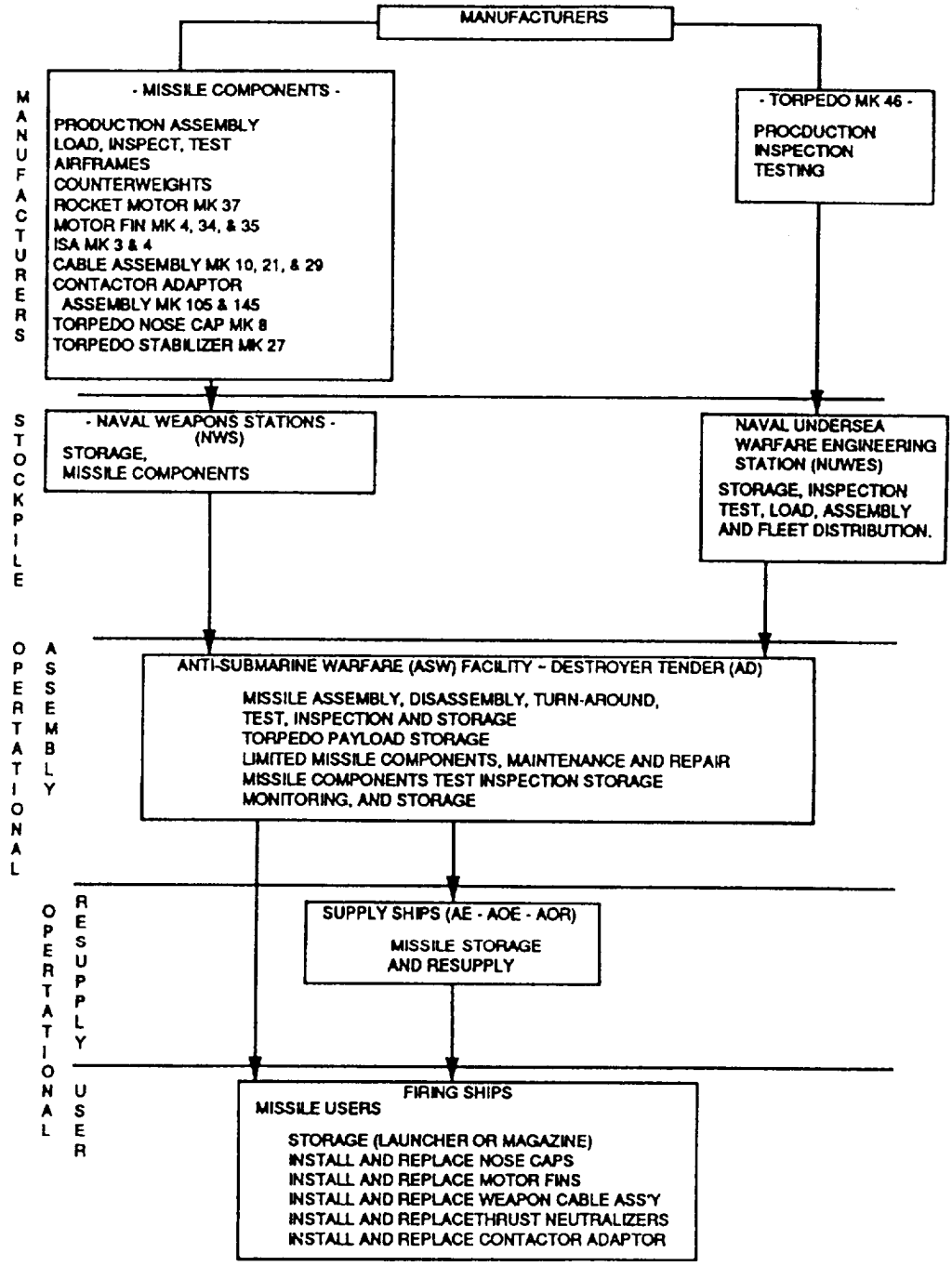


Figure 4-4.-Logistic flow chart for ASROC missile components/spares.

provided by the various shore activities under the logistics and funding control of NAVSEASYSCOM and SPCC. An exception to this is the rocket motor Mk 37 and the service handling equipment (SHE) for organizational and intermediate level maintenance.

ASROC components are stored at Naval Supply Centers (NSC) and at intermediate and depot level sites. Both provide for assembly and issue of tactical missiles, exercise missiles, and training missiles.

Figure 4-4 shows the logistics flow for ASROC missile components and spares from the stockpile points through the various facilities to the firing ship.

Major components and repair and replacement parts for an ASROC missile (less payload) are shipped and stored in reusable containers during the stockpile-to-target sequence. At the organizational level (firing ship), the missile is removed from its container and stowed in the ASROC magazine or launcher. The firing ship returns these empty containers to the IMA and reorders containers for off-loading when required. Containers are not stored onboard the firing ship. IMAs stow components in their respective containers. These containers are marked to properly identify the contents including mark/mod designation and serial number when applicable.

Logistics support for ancillary equipment is provided to the organizational and intermediate level activities for test equipment, assembly fixtures, special tools, standard tools, containers, handling equipment, launch accessories, and Navy special interface gauges.

Figure 4-5 shows the logistics flow of ASROC ancillary equipment including handling equipment and test sets at the organizational and intermediate level activities.

Supply Support Responsibilities

Support responsibilities have been delegated to the various inventory control managers (ICM) based upon hardware peculiarities and the level of maintenance to be supported. Principal ICMs and support responsibilities are assigned to NAVSEA and SPCC. Supply support for service

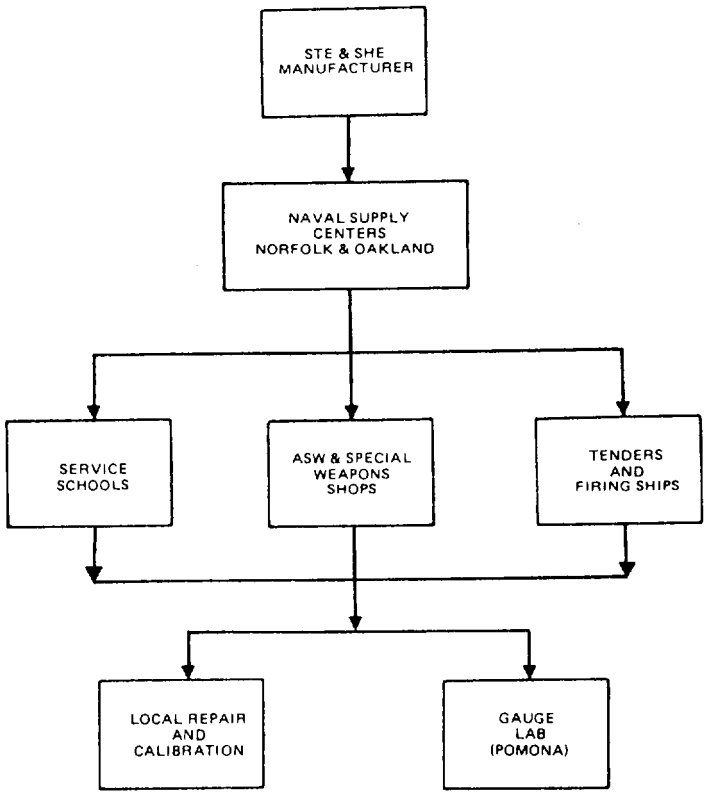


Figure 4-5.-Logistic flow diagram for ASROC ancillary equipment.

test equipment is listed in table 4-1. The inventory control manager's responsibilities include the following:

1. Issuing desired stock status information
2. Initiating of timely procurement for items in low supply
3. Expediting completion of fleet requisitions
4. Programming repair of defective hardware
5. Expediting return of defective material
6. Determining the most expeditious transportation routing
7. Providing supply follow-up
8. Tracing lost material
9. Performing property accounting
10. All other functions normally associated with inventory control management

Material Requisitions and Replenishment

A requisition must be submitted for replenishment of all ASROC material supported by the federal supply service. The Single Line Item Requisition System Document, DD Form 1348, is used according to MIL-STD *Requisition Issue Procedures Manual,* NAVSUP Publication 437, or *Afloat Supply Procedures,* NAVSUP Publication 485, as applicable for requisitioning purposes. Material that is defective when received from the federal supply service will be reported to the Navy Fleet Material Support Office in accordance with NAVSUPINST 4440.120. Exceptions to reportable items are enumerated within the instruction. All facilities requiring ASROC missile components (less payload) must submit their requisitions to SPCC. SPCC will authorize the movement of components from the stockpile centers to the requesting activity.

Urgent requisitions may be submitted by naval message or via telephone. If a naval message is chosen because of urgency, it shall be addressed as applicable to the following activities:

1. NSC Oakland, California, or Norfolk, Virginia (all National Supply System cognizant material except 8A and 4T).
2. NSC Oakland, California, or Norfolk, Virginia (8A cognizant material).
3. SPCC (4T cognizant material).

Spare parts usage data is maintained by each cognizant inventory control manager and is based on information obtained from requisitions. Each activity should maintain its own inventory control system, indicating location of material, usage data, material on order, and quantity on hand. Each activity should maintain an active follow-up system of condition code reporting and shipment status.

REPORTING REQUIREMENTS

The inventory control managers must be advised of all movements of 4T cognizant material (torpedoes, torpedo components, and ASROC components). A DOD Single Line Item Release and Receipt Document, (DD Form 1348-1) must be used for submitting reports to the ASROC inventory control manager.

DD Form 1348-1 and DD Form 1149

Requisition and Invoice Shipping Document, DD Form 1149, is used by the ASROC inventory control manager for shipment of all 4T cognizant items and for initial outfitting. Copy one of DD Form 1348-1 and copy one of the DD Form 1149 carry a stamped block for use in the verification of receipt for materials received. Activities in receipt of material from the inventory control manager will sign, date, and return copy one to verify receipt of the equipment.

ASROC REPORTING SYSTEM

All shore activities and fleet units engaged in assembly, storage, transfer, or use of the ASROC missile must complete an Intermediate/ Organizational Maintenance and Transaction Log (NAVSEA Form 8830/1 [1A]). The Intermediate/ Organizational Maintenance and Transaction Log contains the following sections:

1. Section I—IMA Report
2. Section II—Transaction Log
3. Section III—Firing Ship Report

The purpose of **section I (IMA Report)** is to document the data that is acquired during ASROC missile and missile component inspection, assembly, turnaround, disassembly or testing, and to report defective components discovered during any of the procedures.

The purpose of **section II (Transaction Log)** is to document each action involving change of custody, serviceability status, or expenditure of the assembled ASROC missile. The activity initiating the entry in section II is responsible for forwarding a copy of section II to: Commanding Officer, Naval Weapons Station, Seal Beach Detachment, Naval Warfare Assessment Center (Code 3433), Corona, California 91720-5000, within 24 hours of the action.

The purpose of **section III (Firing Ship Report)** is to document the data required for the Consolidated ASROC Database that is acquired during fleet custody of an ASROC missile.

Table 4-1.-Required Support for Service Test Equipment (STE)

Designation	Nomenclature	LD, DL or Dwg No.	Quantity Required at each Facility (Per Line)					Function	Inventory Support Control Managers	Calibration Frequency
			Firing Ship	AD	ASW	AE/AOE	Schools			
—	Safety Chamber	LD497717 1805670	0	1	1	0	2	ISA Test	SPCC	—
Mk 620 Mod 0		DL1984645	0	1	1	0	1	ISA/RASP Test	Navy Gauge and Standards Center, Pomona, Calif.	1 year
	Safety Chamber Assy	DL5268367	0	1	1	0	1			—
	Motor Band Shield Assy	DL5268373	0	1	1	0	1			—
	Airframe Band Shield Assy	DL5268379	0	1	1	0	1			—
Mk 484 Mod 1	Gyroscope Test Set	3277490	0	1	1	0	3	Fault and Isolation Test	SPCC	6 months
—	Test Cable	5268192 (SK690183)	0	1	1	0	3	Continuity Test ISA Mk 3	NOSC	Test Daily When Used
—	Tool, Pin Release	1984969 (SK690152)	0	1	1	0	3	Fault and Isolation Test	NOSC	—
—	Test Pin	2169737	0	2	2	0	3	Fault and Isolation Test	NOSC	—
—	ASROC Payload Test Adaptor	—	0	1	2	0	2	Continuity Test ISA Mk 4	NOSC	—
—	Multimeter AN/PSM-4D or Simpson 260	—	0	2	2	0	3	Fault and Isolation Test	SPCC	1 year
—	Beam Indicator Assembly	1806042	0	1	1	0	1	Missile Deflection Checks	Navy Gauge and Standards Center, Pomona, Calif.	1 year
—	Gauge Alignment Launching Lug (LG Mk 16)	1805883 or 3018165	1	1	1	0	1	Checks Launching Lug Alignment	Navy Gauge and Standards Center, Pomona, Calif.	1 year
—	Gauge Alignment Launching Lug (GMLS Mk 26)	3030318	1	1	1	0	1	Checks Launching Lug Alignment (GMLS Mk 26)	Navy Gauge and Standards Center, Pomona, Calif.	2 years
—	Gauge, Not Go Wear Template	3236987	0	1	1	0	1	Checks wear of Lug ears on ASROC Launching Lug	Navy Gauge and Standards Center, Pomona. Calif.	2 years
—	Gauge, Airframe Alignment	3018165	0	1	1	0	1	Checks Airframe Alignment	Navy Gauge and Standards Center, Pomona, Calif.	1 year

Table 4-2.—EHWS Maintenance Concept

Maintenance Level				
WEAPON SYSTEM ELEMENT	ORGANIZATIONAL: SUBMARINE	EXPANDED ORGANIZATIONAL: AS (SELECTED SHORE SITES)	INTERMEDIATE: WPNSTA-CONCORD/ YORKTOWN	DEPOT
TSS DMS	• Complete system checkout • Fault isolate • Replacement of circuit cards/ component parts • Ordance Alteration (ORDALT) incorporation	NA	NA	• TSS-NOS/IH MD DMS-NUWES Keyport
Encapsu-lated HARPOON Missile	• Loading and handling • Receipt inspection • Perform BIT • Replacement of faulty lanyards, umbilical cables and shear pins • Corrosion control	• Handling and Ready-For-Issue (RFI) storage • Receipt inspection • Replacement of faulty lanyards, umbilical cables and shear pin • Exterior cleaning and paint touch-up	• Subsystem checkout • AUR system checkout • Encapsulate • Repair capsule	• Repair capsule • MDAC
HARPOON Missile (slick)	NA	NA	• Complete system checkout • Fault isolate • Replacement of failed components • Incorporate equipment im-provements	• Repair of components beyond the Intermediate Level Capability Component Manu-facturer
Containers Mk 630 Mod 0	NA	• Handling • Inspection • Decontainerizing • Containerizing	• Storage • Repair	• Established Channels

HARPOON MAINTENANCE

Maintenance of the Encapsulated Harpoon Weapon System (EHWS) and its supporting hardware is done at the organizational, intermediate, and depot maintenance levels. The maintenance concept of the weapon system is shown in table 4-2. Organizational level maintenance is done by military/contractor personnel. Intermediate level maintenance is performed by military and Navy civilian and contractor personnel. Maintenance required beyond the capability of intermediate level maintenance activities is completed by the applicable equipment manufacturer. Maintenance peculiar to the submarine launched configuration of the EHWS involves the following Harpoon related items:

1. Surface Attack Guided Missile Capsule Assembly UGM-84A-1/C-1/D-1 and UTM-84A-1/C-1/D-1
2. Test set simulators (TSS) TS-3521 DSM
3. Digital Missile Simulator Mk 75 Mod 0 or Mod 1
4. Encapsulated Harpoon Missile Mk 630 Mod 0 Shipping Container
5. Common Support Equipment
6. Certification Training Vehicle - interim (CTV-1)
7. Encapsulated Harpoon certification and training vehicle (EHCTV) Peculiar Support Equipment

ORGANIZATIONAL LEVEL MAINTENANCE

Organizational level maintenance of the EHWS (Maintenance of Missiles, Encapsulated Harpoon Command and Launch Subsystems (EHCLS), digital missile simulator, and test set simulator) is completed by SSN personnel.

The encapsulated missile (fig. 4-6) is loaded aboard the submarine as an All-Up-Round

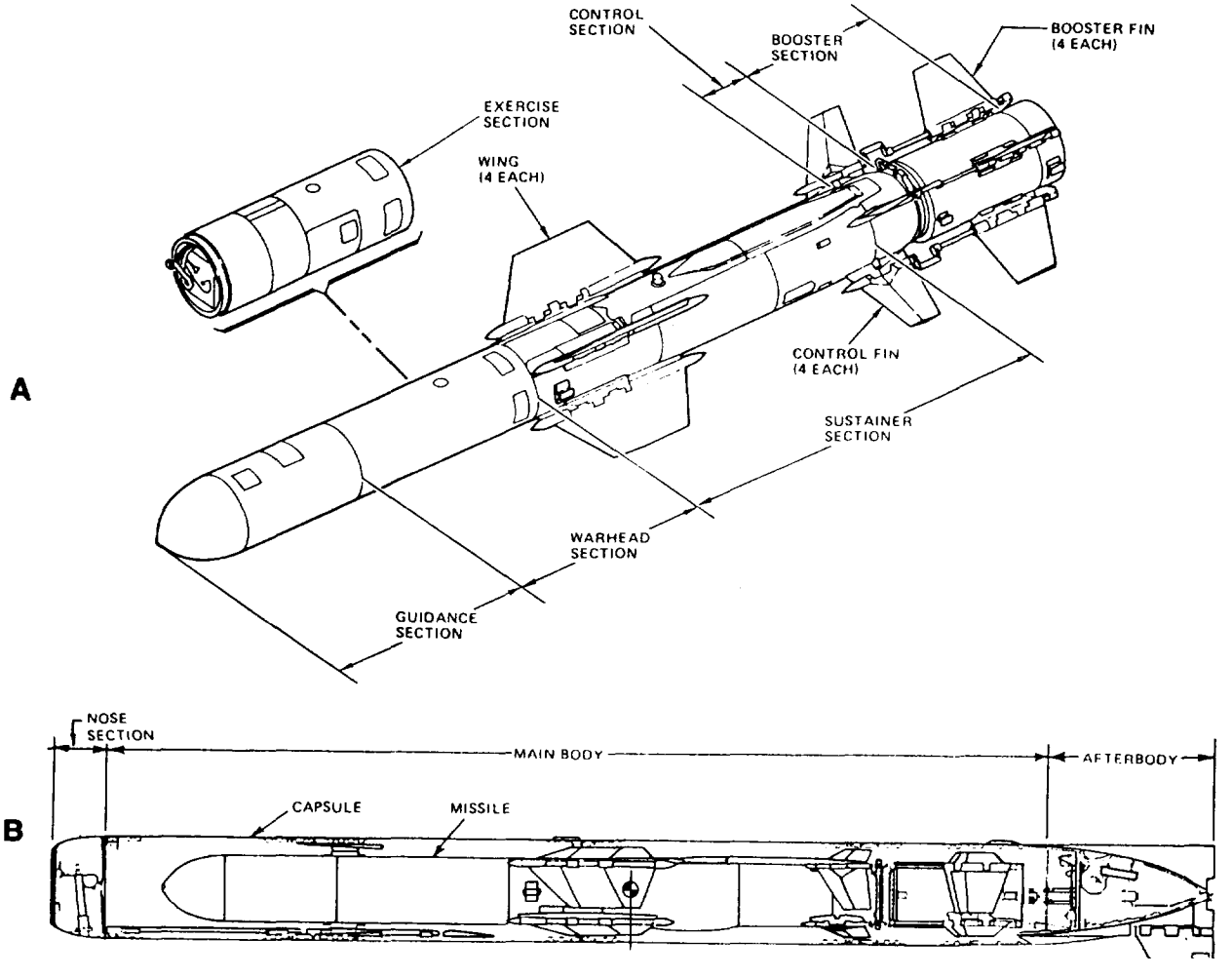


Figure 4-6.-A. Harpoon missile configuration; B. Encapsulated Harpoon missile.

(AUR). Upon receipt by the SSN, the missile is inspected according to procedures in *Firing Craft Operating Procedures and Checklist for Encapsulated Harpoon,* OD 44979, Volume 9. The missile is then tube loaded and a missile built-in-test (BIT) is performed. As long as the missile is on board, the BIT is repeated semiannually according to applicable MRC procedures. The BIT is also required just prior to unshipping the weapon. Missiles failing receipt inspection criteria or BIT checks are returned to the weapon station (WPNSTA) for corrective action. Current maintenance concepts also provide for a 48-month operational deployment from the date of the AUR test at the WPNSTA, after which the encapsulated missile must be returned for retest. Capsule corrective maintenance aboard the SSN is limited to the following actions which may be done by TMs:

1. Repair or replacement of defective umbilical cables
2. Replacement of defective lanyards, fin restraint rivets
3. Visual inspection of external surfaces
4. Corrosion control

Organizational maintenance of the EHCLS is done by Fire Control Technician personnel. It is limited to periodic self-tests conducted according to the Planned Maintenance System (PMS) documentation and the limited replacement of defective modules and components identified through fault isolation and troubleshooting procedures. Maintenance of the EHCLS hardware does not include intermediate level repair.

Maintenance of the test set simulator at the submarine level is done by Fire Control Technicians and is limited to the following actions:

1. Operation of self-tests according to PMS documentation
2. Replacement of minor parts (knobs, screws, lamps, and so forth)
3. Fault isolation and limited repair (replacement of modules and components)

There is no planned maintenance for the fault isolation kit at the submarine level. Operational suitability of the various modules/components will only be determined when they are used in troubleshooting the applicable EHCLS equipment. Replacement for modules/components found to be defective will be requisitioned from the supply system by ship's force.

Scheduled maintenance of the digital missile simulator consists of tests and inspections prescribed in the MRCs. The MRCs provide specific procedures for quarterly lamp and self-tests and annual visual inspection and cleaning. For corrective maintenance, troubleshooting is done by means of test and fault isolation procedures provided in the DMS technical manual *Description, Operation, and Maintenance for the Digital Missile Simulator Mk 75 Mod 0,* ST890-JO-MMO-010/DMS. These DMS procedures use maintenance assistance modules (MAMs).

INTERMEDIATE LEVEL MAINTENANCE

Intermediate level maintenance for the EHWS and the Mk 630 Mod 0 missile container is performed at the WPNSTA Concord, California, or the WPNSTA Yorktown, Virginia. Submarine tenders (ASS) and shore-based submarine support facilities provide only missile inspection, storage, and transshipment functions.

Encapsulated missiles returned to the WPNSTA Concord, or the WPNSTA Yorktown, for intermediate level maintenance are de-encapsulated, inspected, and AUR tested. Missiles that exhibit a fault during AUR tests must be returned to the depot for repair, or if the fault is within the intermediate level maintenance repair capability, they must be disassembled. After disassembly, the defective section or replaceable assembly is replaced with an operational section, or replaceable assembly and then retested. Tests of the capsule by an intermediate level maintenance activity include continuity and isolation tests, fault isolation of the electrical circuitry, vacuum leak tests, and a pressure check of the capsule and the broach sensor.

Repairs of Harpoon missile containers are accomplished by repair facilities at NWS Concord, and NWS Yorktown.

DEPOT LEVEL MAINTENANCE

Depot level maintenance is performed by the component manufacturer. Maintenance requirements for the missile at the depot level include the following:

1. Repair of components that are common to other Harpoon weapon system applications
2. Repairs that are beyond the capabilities of organizational and intermediate levels
3. Failure diagnosis of removed units/assemblies

SUPPORT PROGRAMS

Supply support for the EHWS is based on the three-level maintenance concept. However, not all components of the system are maintained at each level. The program as it relates to submarines has a limited ECHCS supply support at all levels. Supply support for the encapsulated missile, digital missile simulator, and test set simulator is at the organizational level only. Program management for supply support of the weapon system is delegated to the following activities:

1. Encapsulated Harpoon
   a. Naval Air Systems Command (NAVAIRSYSCOM) AIR-42032A1 Inventory Control Manager
      (1) NAVAIRSYSCOM AIR-4181A1 Assistant Program Manager—Logistics (APM/L)
      (2) Naval Underwater System Center (NUSC) (Code 8312)—Technical Cognizant Activity (for Capsule only)
      (3) NUSC (Code 8313)—Integrated Logistics Support (for Capsule and CAP/CAN Test Set only)
      (4) Naval Ship's Parts Control Center (NSPCC) (Code 05332B)—Inventory Control Point
      (5) Naval Weapons Center (NAVWPNCEN) (Code 3606)—Technical cognizance of the basic (slick) Harpoon Missile de-encapsulated)
      (6) Pacific Missile Text Center (PMTC) (Code 1091)—In-Service Engineering Agent for the Encapsulated Harpoon in the AUR Configuration
2. Test Set Simulator (TSS)
   a. NAVSEASYSCOM SEA-62H Program Manager
      (1) Naval Ordnance Station/Indian Head (NOS/IH) (Code 5241A)—Technical Cognizant Activity
      (2) NSPCC (Code 532)—Inventory Control Point
3. Digital Missile Simulator (DMS)
   a. NAVSEASYSCOM PMS 409—Program Manager
      (1) Naval Undersea Warfare Engineering Station (NUWES) Keyport—Acquisition Engineering Activity In-Service Engineering Agent
      (2) NSPCC—Inventory Control Point (Code 532)
4. (Encapsulated Harpoon Certification and Training Vehicle (EHCTV)
   a. NAVSYSCOM (PMA-258E)—Deputy for Submarines
   b. NAVAIRSYSCOM (PMA205-11)—Assistant Program Manager-Training
   c. USC (Code 8312)—Technical Cognizant Activity
   d. USC (Code 8313)—Integrated Logistics Support Manager
   e. NSPCC (Code 05332B)—Provisioning Supply Point

Naval Underwater Systems Center (NUSC) has been designated technical fleet support coordinator for installation and subsequent maintenance of the EHWS in the submarine fleet and at the submarine support facilities. Fleet support uses services of personnel from NUSC, Naval Sea Support Center Atlantic/Pacific (NAVSEACENLANT/PAC), PMTC, and contractor personnel as required.

Initial Outfitting

Initial outfitting of onboard spares, repair parts, and related equipment is provided through the federal supply service according to Coordinated Shipboard/Shore-Based Allowance Lists (COSALs/COSBALs), Allowance Parts Lists (APLs), and Allowance Equipage Lists (AELs). Responsibility for timely requisitioning of initial outfitting items is based on the circumstance under which the SSN is provided Harpoon weapon system capability as described in subsequent paragraphs. Adequate requisitioning lead time should be planned to ensure receipt of support materials before installation is completed.

NEW CONSTRUCTION INSTALLATIONS.— SSNs acquiring Harpoon capability during new construction (SSN 688 Class) will be outfitted by the shipyard's outfitting supply activity (OSA). The OSA should acquire applicable COSAL/AEL/APLs from SPCC and requisition support items through the federal supply service.

INSTALLATION DURING REGULAR OVERHAUL (ROH).— SSNs acquiring Harpoon capability during ROH (SSN 594 and 637 Class) will be outfitted by the integrated Logistic Overhaul Program (ILOP) team. The ILOP team should requisition onboard spares by using NAVSUP Pub 485 and current allowance

documentation for the applicable SSN fire control system configuration.

INSTALLATION DURING RESTRICTED AVAILABILITY (RAV).— SSNS acquiring Harpoon capability during RAV will be outfitted by the ship's supply department. The ship's supply department working with the NAVSEACENLANT/PAC team should requisition allowable onboard spares, repair parts, and related equipment by using NAVSUP Pub 485 and the allowance documentation applicable to the particular SSN fire control system configuration.

The majority of hand tools required aboard submarines are available at the required EHWS designated sites. Support and test equipment not already available aboard SSNS are furnished at the time of weapon system hardware installation. General-purpose electronic test equipment items are furnished according to the SPETERL.

Material Replenishment

A requisition must be submitted for the replenishment of all Harpoon material supported by the federal supply service. Routine requisitions are submitted on a DD Form 1348, according to the *MILSTRIP/MILSTARP Operating Procedures Manual,* NAVSUP Pubs 437 or 485. Receipt of defective material from the federal supply service is reported to the Navy Fleet Material Support Office according to NAVSUPINST 4440.120. Exceptions to reportable items are enumerated within the instruction.

Disposition of Defective Hardware

Mandatory deficiency reports are required, when, during incoming inspection or receipt and damage inspection, handling operations, and/or preparations for firing, deficiencies are discovered that prevent the employment of a weapon and/or result in an unscheduled offload. Also reported are all corrective maintenance actions performed on the missile. An example being the replacement of umbilical cables or the lanyard assembly during loading operations and the performance of a BIT, conducted according to Harpoon fire control MRCs, that results were negative.

Reports of Unsatisfactory or Deficient Torpedoes and Equipment (RUDTORPE) are used to provide or request information relative to procedures, documentation, hardware disposition, and support problems. Both deficiency reports and RUDTORPES are submitted on Torpedo Maintenance Data Form, NAVSEA 8510/5 and according to the *Torpedo Management Information System (TMIS),* TW510-AA-PRO-020/030.

All defective encapsulated Harpoon missiles must be returned to the weapon station, with all residual hardware.

DOCUMENTATION RECORDS AND REPORTS

Documents and records perform highly essential functions in the operation of the weapon system. Publications contain and convey the factual data and procedural instructions required to guide and indoctrinate personnel in the proper operation of the system. Operational records, including reports of successful operation, failure, or malfunction, are required to be maintained. They indicate the degree of success with which the weapon system is performing its function, and point the way to desired or necessary improvement. Finally, routine records provide a system for accountability and an audit of condition history—either of which should be left to memory.

OPs, ODs, and other support documentation are listed in table 4-3. Initial distribution of OPs and ODs and subsequent changes or revisions thereto are made automatically according to the distribution list applicable to each document.

In support of (3-M's) PMS, MRCs have been prepared by NUSC for the EHWS support aboard submarines currently having operational capability for Harpoon missiles. MRC data basically consist of preventive maintenance information to support EHWS. Corrective procedures to support maintenance requirements are included in appropriate technical manuals.

Records are required to provide a complete history of significant events occurring during the life cycle of each encapsulated missile and to maintain accountability of its major serialized components. Effective reports are necessary to enable the distribution of essential maintenance, deficiency, and operational performance data to cognizant activities for engineering analyses. Recognition, reporting, and subsequent resolution of existing or potential system deficiencies are thereby facilitated and system readiness and capability improved. Feedback information resulting from the analysis of the reports is provided to maintenance activities in the fleet and to contractor repair facilities, subsequently enhancing overall logistics support of the weapon system.

Table 4-3.-EHWS Documentation/Publication Support

TECHNICAL MANUAL NUMBER	TITLE
ASW-TP-018-C-1240	Weapon System Consolidated Operability Test for FCS Mk 117 Mods 1, 2 and 3
MIP J-001/XXX-XX	Maintenance Index Page - CCS Mk 1
MIP J-117/XXX-XX	Maintenance Index Page - FCS Mk 117
MIP J-1084/002	Maintenance Index Page - Missile Encapsulated HARPOON UGM-84
OD 43690, Vol. 6	ASW Weapon Systems Accuracy Trials Program for Submarines with Fire Control System Mk 117 Mods 1, 2 and 3
OD 44979, Vol. 1	Introduction and Description
OD 44979, Vol. 2, Part 1	Firing Craft Operating Procedures and Checklists for Weapon Loading and Handling System for SSN-637 Class Submarines
OD 44979, Vol. 2, Part 2	Firing Craft Operating Procedures and Checklists for Weapon Loading and Handling Systems for SSN-671
OD 44979, Vol. 2, Part 3	Firing Craft Operating Procedures and Checklists for Weapon Loading and Handling Systems for SSN-685
OD 44979, Vol. 2, Part 4	Firing Craft Operating Procedures and Checklists for Loading and Handling Systems for SSN-594 Class Submarines
OD 44979, Vol. 2, Part 5	Firing Craft Operating Procedures and Checklists for Weapon Loading and Handling Systems for SSN-688 Class Submarines/Ships Systems Manual (0I-631-3)
OD 44979, Vol. 3, Part 5	Firing Craft Operating Procedures and Checklists for Fire Control System Mk 117 Mod 0/Ship Systems Manual (0I-631-31)
OD 44979, Vol. 3, Part 7	Combat Control system Mk 1
OD 44979, Vol. 3, Part 11	Combat Control System Mk 1
OD 44979, Vol. 4, Part 5	Firing Craft Operating Procedures and Checklists for Weapon Emergencies, Fire Control System Mk 117 Mod 0
OD 44979, Vol. 4, Part 6	Firing Craft Operating Procedures and Checklists for Weapon Emergencies, Fire Control System Mk 117 Mods 1, 2, and 3
OD 44979, Vol. 4, Part 7	Weapons Emergencies, CCS Mk 1

Table 4-3.-EHWS Documentation/Publication Support—Continued

TECHNICAL MANUAL NUMBER	TITLE
OD 44979, Vol. 9	Firing Craft Operating Procedures and Checklists for Encapsulated HARPOON Missile (UGM-84A-1)
OD 44979, Vol. 17	Weapon Monitoring Equipments
OD 46376	System Installation Data (SSN 700) for FCS Mk 117 Mod 0
OD 46579	Fire Control System Mk 117 Mod 0, General Information Manual (SSN 700)
OD 49329	General Information Manual (Mk 117 FCS Backfit)
OD 49330	Installation Data (Mk 117 FCS Backfit)
OD 49376	Fire Control System Mk 117 Mod 0, Installation Data
OD 50288	Fire Control System Mk 117 Mods 0, 1, 2 and 3, Operations Manual
OD 53342	Logistics Support Manual for Encapsulated HARPOON
OP 3548	Torpedo Tube Mk 63 Mods 1-12
OP 4042	Underwater Battery Fire Control Switchboard Mk 41 Mods 10 and 11 for SSN 686 and SSN 687, Description, Operation and Maintenance
OP 4057	Torpedo Tube Mk 63 Mods 13-16 (SSN 685)
OP 4152, Vols. 1-2	Underwater Battery Fire Control Switchboard Mk 41 Mods 12 and 13 for SSN 688 Class, Description, Operation and Maintenance
OP 4240	Description, Operation and Maintenance, Attack Control Console Mk 92 Mod 0 and Mod 2
OP 4263, Vols. 1-3	Description, Operation and Maintenance, Weapon Data Converter Mk 82 Mods 1 and 2
NAVAIR 01-A/ RGM84A-2-3.5	Intermediate (Weapons Department Afloat/Ashore) Maintenance, Missile Sentencing Instructions for HARPOON Missile Configurations, Surface Attack-Capsule-UGM-84A-1, UGM-84C-1, Exercise Training-Capsule-UTM-84A-1, UTM-84C-1, Training Inert Warhead-Capsule-UTM-84A-1A, UTM-84C-1A
17-15MDA-16	Description, Operation and Maintenance Instructions with Parts List, HARPOON Capsule and Canister Test Set, Part No. 72D205011-1013, -1015 and Halogen Gas Detector Assembly Part No. 72D205616-1003
NAVAIR ILSP 4133-8408 PMA-258B	Integrated Logistic Support Plan for Encapsulated HARPOON Missile Certification and Training Vehicle (EHCTV)
NAVAIR 01-UTM-84A-1D	Servicing and Maintenance Manual for Encapsulated HARPOON Certification and Training Vehicle (EHCTV) UTM-84A-1D

Table 4-3.-EHWS Documentation/Publication Support—Continued

TECHNICAL MANUAL NUMBER	TITLE
SW820-AG-MMO-010/ (C)UGM-84	Encapsulated HARPOON Description, Operation and Maintenance Manual
N/A	Missile-Missile Related Post Conference Provisioning Parts List, 21 December 1984, Revision K, Volume II
TBD	NAVAIR Naval Airborne Weapons Maintenance Process Specification, 31 January 1984
ST890-J0-MMO-010/ DMS Mk 75 Mod 0	Description, Operation and Maintenance Digital Missile Simulator Mk 75 Mod 0
ST890-J1-MMO-010/ DMS Mk 75 Mod 1	Description, Operation and Maintenance Digital Missile Simulator Mk 75 Mod 1
SW820-AB-WHM-010/ HARPOON Handling QATIP 445	Handling, Maintenance and Stowage Procedures and Quality Assurance Test and Inspection Procedures (QATIP), Encapsulated HARPOON Missile
TW510-AA-PRO-020/TMIS	Torpedo Management Information System, TMIS Organizational Level Maintenance Activity, Reporting Instructions for Submarine Fired Weapons/Vehicles
TW510-AA-PRO-030/TMIS	Torpedo Management Information System, TMIS Intermediate Level Maintenance Activity, Reporting Instructions for Submarine Fired Weapons/Vehicles

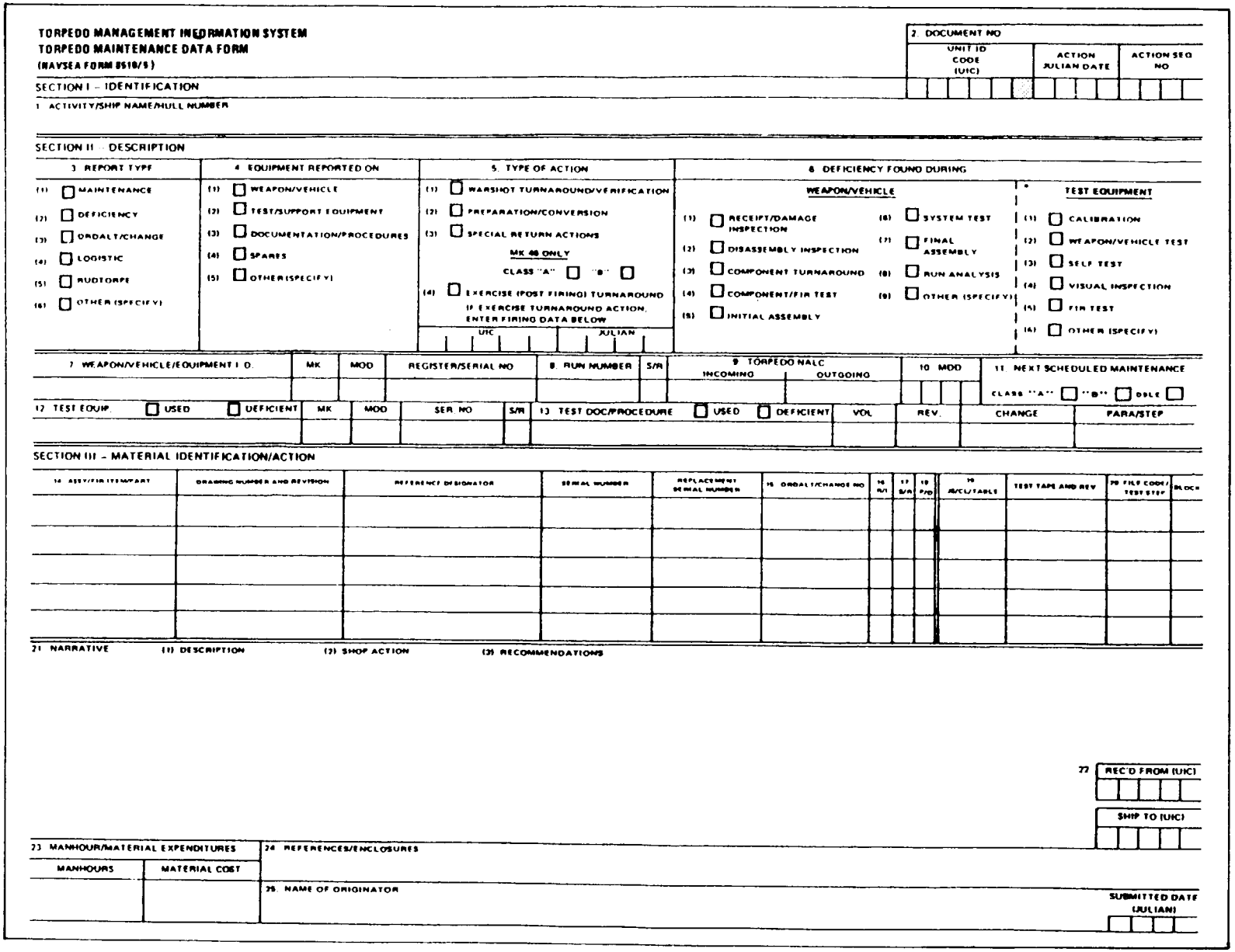
Harpoon Equipment History and Operating Log

The Harpoon missile history log sheet is the primary vehicle used to record the history of each assembled weapon. It is a chronological record of operations performed by each activity. Receipts, shipments, tests, inspection, firing attempts, expenditures, and other events are entered in accordance with log sheet instructions. Organizational level users of the encapsulated Harpoon weapon must use the log sheet to record BITs also. Continuation sheets should be added as needed. Each time the missile is received at the NWS, an up-to-date copy of the Harpoon missile history log sheet will be sent to FLTAC.

The Harpoon Configuration and Operating Logbook will accompany the missile. When the missile is fired or otherwise expended, the log is returned to the Officer in Charge, Fleet Analysis Center (FLTAC), WPNSTA, Seal Beach, Corona, California. The logbook is a composite of several different maintenance data forms: Collection-Configuration Summary, NAVSEA Forms 9790/5, Harpoon Missile History Log Sheet (FLTAC-8821), Fleet Maintenance Data Collection Form (ALMS) (NAVAIR 4790/1), Fleet Configuration Summary Forms (OPNAV 8600.2/1), and instructions on use and completion of the different forms.

Torpedo Management Information System (TMIS)

TMIS is governed by NAVSEAINST 8510.3. The Torpedo Maintenance Data Form (NAVSEA-SYSCOM Form 8510/5) is the vehicle used to



TORPEDO MANAGEMENT INFORMATION SYSTEM
TORPEDO MAINTENANCE DATA FORM
(NAVSEA FORM 8510/5)

2. DOCUMENT NO
UNIT ID CODE (UIC) | ACTION JULIAN DATE | ACTION SEQ NO

SECTION I – IDENTIFICATION

1. ACTIVITY/SHIP NAME/HULL NUMBER

SECTION II – DESCRIPTION

3. REPORT TYPE
(1) ☐ MAINTENANCE
(2) ☐ DEFICIENCY
(3) ☐ ORDALT/CHANGE
(4) ☐ LOGISTIC
(5) ☐ RUDTORPE
(6) ☐ OTHER (SPECIFY)

4. EQUIPMENT REPORTED ON
(1) ☐ WEAPON/VEHICLE
(2) ☐ TEST/SUPPORT EQUIPMENT
(3) ☐ DOCUMENTATION/PROCEDURES
(4) ☐ SPARES
(5) ☐ OTHER (SPECIFY)

5. TYPE OF ACTION
(1) ☐ WARSHOT TURNAROUND/VERIFICATION
(2) ☐ PREPARATION/CONVERSION
(3) ☐ SPECIAL RETURN ACTIONS
MK 48 ONLY
CLASS "A" ☐ "B" ☐
(4) ☐ EXERCISE (POST FIRING) TURNAROUND
IF EXERCISE TURNAROUND ACTION, ENTER FIRING DATA BELOW
UTC | JULIAN

6. DEFICIENCY FOUND DURING
WEAPON/VEHICLE
(1) ☐ RECEIPT/DAMAGE INSPECTION
(2) ☐ DISASSEMBLY INSPECTION
(3) ☐ COMPONENT TURNAROUND
(4) ☐ COMPONENT/FIR TEST
(5) ☐ INITIAL ASSEMBLY
(6) ☐ SYSTEM TEST
(7) ☐ FINAL ASSEMBLY
(8) ☐ RUN ANALYSIS
(9) ☐ OTHER (SPECIFY)

TEST EQUIPMENT
(1) ☐ CALIBRATION
(2) ☐ WEAPON/VEHICLE TEST
(3) ☐ SELF TEST
(4) ☐ VISUAL INSPECTION
(5) ☐ FIR TEST
(6) ☐ OTHER (SPECIFY)

7. WEAPON/VEHICLE/EQUIPMENT I.D.	MK	MOD	REGISTER/SERIAL NO	8. RUN NUMBER	S/R	9. TORPEDO NALC INCOMING	9. TORPEDO NALC OUTGOING	10. MOD	11. NEXT SCHEDULED MAINTENANCE
									CLASS "A" ☐ "B" ☐ DBLE ☐

12. TEST EQUIP. ☐ USED ☐ DEFICIENT	MK	MOD	SER NO	S/R	13. TEST DOC/PROCEDURE ☐ USED ☐ DEFICIENT	VOL	REV.	CHANGE	PARA/STEP

SECTION III – MATERIAL IDENTIFICATION/ACTION

14. ASSY/FIR ITEM/PART	DRAWING NUMBER AND REVISION	REFERENCE DESIGNATOR	SERIAL NUMBER	REPLACEMENT SERIAL NUMBER	15. ORDALT/CHANGE NO	16. R/I	17. S/R	18. P/D	19. AS/CU/TABLE	TEST TAPE AND REV	20. FILE CODE/TEST STEP	BLOCK

21. NARRATIVE (1) DESCRIPTION (2) SHOP ACTION (3) RECOMMENDATIONS

22. REC'D FROM (UIC)
SHIP TO (UIC)

23. MANHOUR/MATERIAL EXPENDITURES
MANHOURS | MATERIAL COST

24. REFERENCES/ENCLOSURES

25. NAME OF ORIGINATOR

SUBMITTED DATE (JULIAN)

Figure 4-7.—Sample Torpedo Maintenance Data Form.

report deficiencies, corrective maintenance, and informal Report of Unsatisfactory or Deficient Torpedoes and Equipment (RUDTORPES) (fig. 4-7).

The Torpedo Maintenance Data form is routinely used by submarines to report expendable ordnance item maintenance, ordnance alteration (ORDALT) accomplishments, and as an informal communication link between submarines and cognizant technical and supply support agencies. The Torpedo Maintenance Data form provides for closing the loop between the using activity reporting the problem and the cognizant technical activity taking actions toward satisfactory problem resolution. Responses are provided to originators and problem statuses are tracked until they are closed out.

It is important to note the importance of submitting Torpedo Maintenance Data forms when events occur. This will ensure timely response to fleet reported problems.

NAVSEA technical document TW510-AA-PRO-020/TMIS provides the organizational level maintenance activity reporting instructions for encapsulated Harpoon deficiency reports and RUDTORPEs. In addition, this document outlines the collecting, processing, and utilization responsibilities for those engineering, technical, and supply agencies directed by COMNAVSEA to support the TMIS.

NAVSEA technical document TW510-AA-PRO-030/TMIS provides the intermediate level (submarine tenders (ASS) and shore-based support facilities) maintenance activity reporting instructions for encapsulated Harpoon RUDTORPE submissions. In addition, this document outlines the collecting, processing, and utilization responsibilities for those engineering, technical, and supply agencies directed by COMNAVSEA to support the TMIS.

Maintenance and Material Management (3-M) Systems

The 3-M Systems are dual purpose in nature. They provide for the preparation of preventive maintenance documentation (MRCs) as well as for the collection of data (MDCS). The 3-M Maintenance Data Collection system (MDCS), as it applies to the EHWS, provides maintenance data relative to the nonexpendable ordnance (EHCLS, fault isolation kit, digital missile simulator, and test set simulator) portion of the weapon system. The governing document for organizational level use is OPNAVINST 4790.4.

Conventional Ammunition Integrated Management System (CAIMS)

Whenever a EHCTV, or its Container Mk 630 is received or. shipped, the activity will submit individual Ammunition Transaction Reports (ATRs) to NSPCC to satisfy CAIMS requirements. This is accomplished in accordance with current fleet and/or NSPCC instructions (CINCLANTFLT INST 8010.4, COMNAVLOGPAC INST 8015.1, and NSPCC INST P8010.12). CAIMS accepts ATRs that are submitted as formatted standard naval messages. The CAIMS data is collected by NSPCC for purposes of inventory control and identification of current asset location. CAIMS data is subsequently provided to FLTAC Central Data Collection Agency (CDCA) in accordance with a data exchange program. CAIMS data is also on line to NAVAIRSYSCOM, NAVSEASYSCOM, Naval Weapons Support Center (NWSC), and selected TYCOM locations.

TOMAHAWK MAINTENANCE

The Tomahawk cruise missile maintenance concept reduces required maintenance at the organizational and intermediate maintenance levels. Weapon reliability is based on the contractor's certification that system components will function within design specification for a specified period of time: 30-36 months depending on the variant of the missile. Before expiration of the certification period, AURs are returned to the Tomahawk Weapons Facility (TWF) or Tomahawk Preparation Facility (TPF) for required maintenance and recertification. Offload and return shipment must commence sufficiently in advance of the maintenance due date to allow for transit time. To meet operational requirements, force commanders may extend the maintenance due date up to a maximum of 90 days. Requirements for extending due dates in excess of 90 days are addressed to CMP (PDA14-414) for approval. Due date extensions are recorded in the appropriate Tomahawk Book.

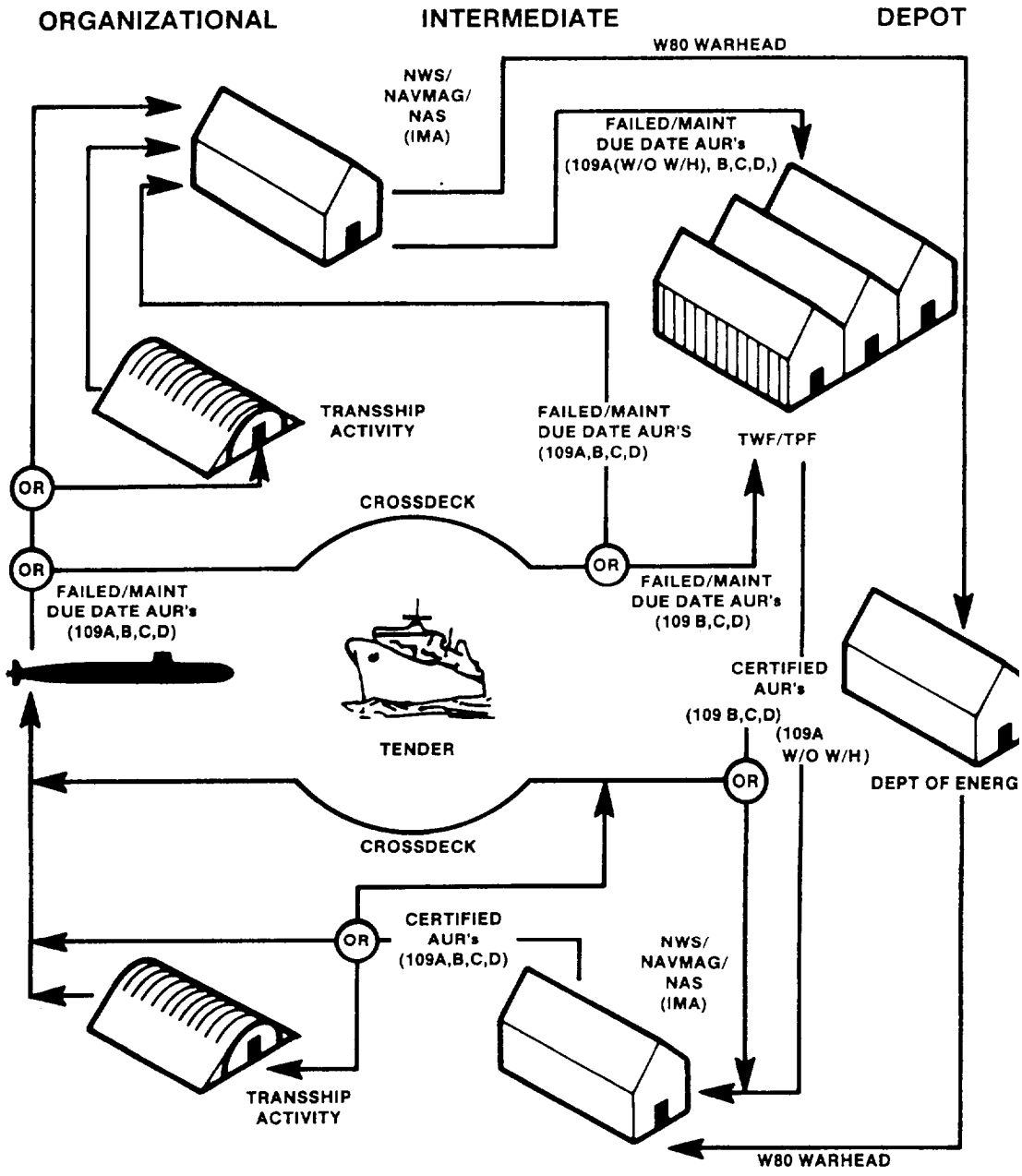


Figure 4-8.-Tomahawk Vertical Launch All-Up-Round Logistics Flow Chart.

New and recertified Tomahawk cruise missiles are fueled, warheaded (except UGM-109A-2), assembled, and stored at-the TWF/TPF until they are encapsulated in the CLS, Mk 45 Mod 0 to become the vertical launch AUR. The UGM-109A-2 warheading cycle is performed at designated shorebase intermediate maintenance activities. Figure 4-8 reflects production flow, and figure 4-9 depicts the typical Tomahawk vertical launch AUR logistics flow from the TWF/TPF to the submarine and return.

ORGANIZATIONAL LEVEL MAINTENANCE

The concept of organizational level maintenance is to remove and replace the AUR when it becomes due for recertification, or on an unscheduled basis when instrumentation or

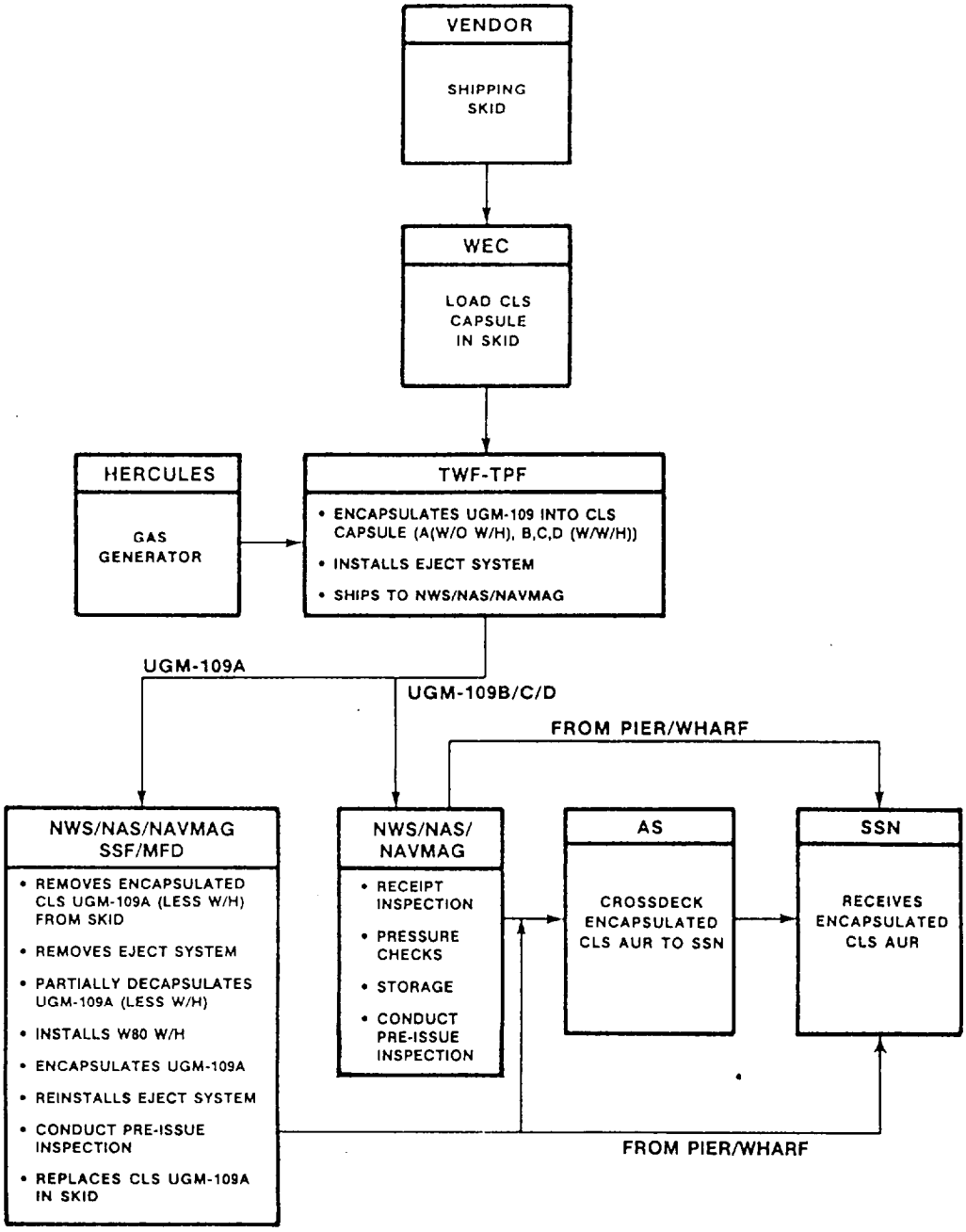


Figure 4-9.-Tomahawk Vertical Launch All-Up-Round Production Flow Chart.

malfunction indicates component/system failure. Organizational maintenance is limited to the segment ring and umbilical connection during off-loading of the AUR. In the case of expended capsule launcher offload, organizational maintenance also includes removal of capsule launching system (CLS) residue from the submarine missile tube.

Organizational level maintenance aboard a submarine is restricted to visual inspections, corrosion preventive actions on the capsule exterior, periodic nitrogen recharging, preparation for launch actions, and replacement of pneumatic and electrical umbilicals. Instructions for these maintenance functions are described in OD 44979 and appropriate MRCs.

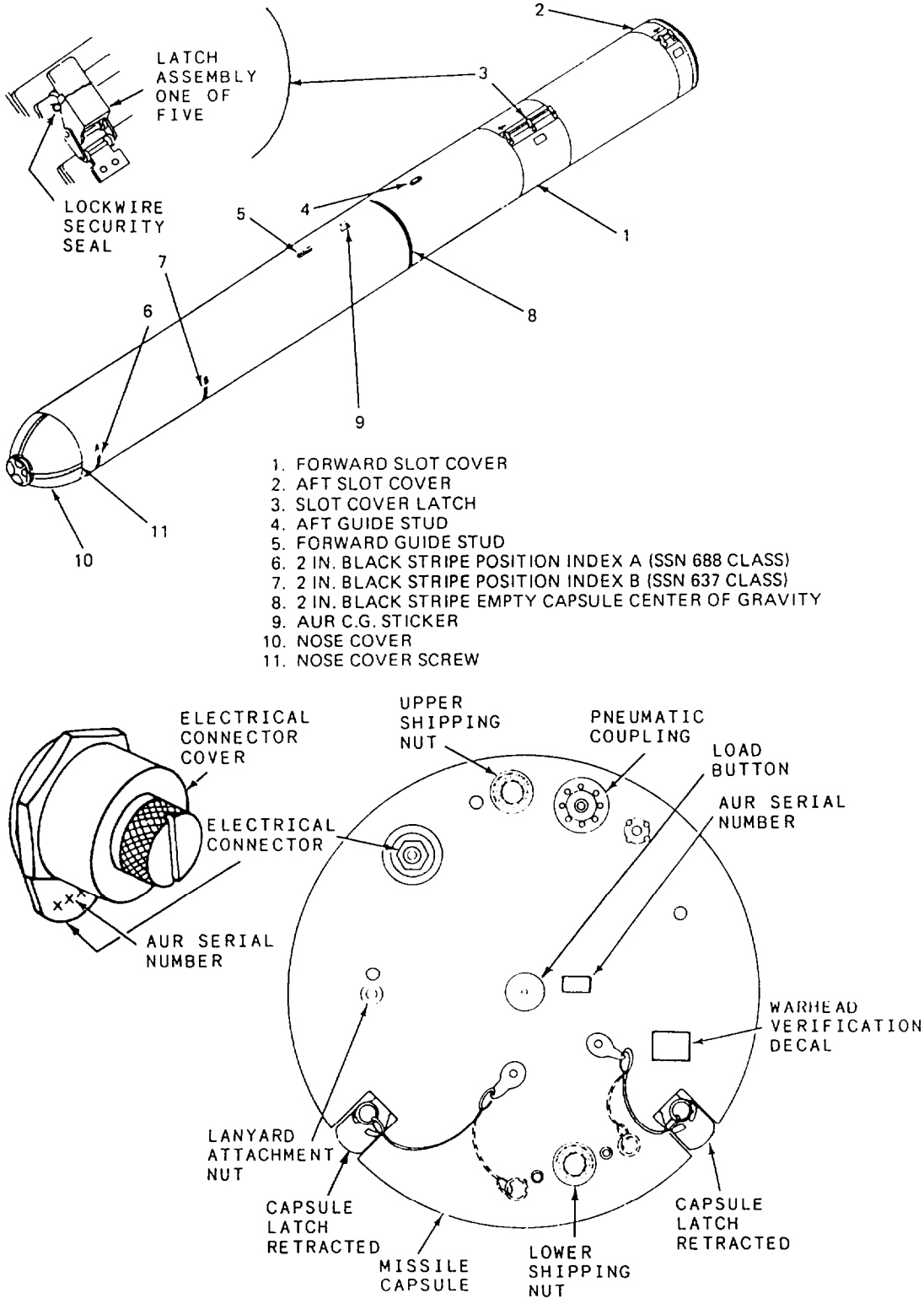


Figure 4-10.-Tomahawk Receipt Inspection Points.

Figure 4-10 shows the receipt inspection points of the Tomahawk missile.

INTERMEDIATE LEVEL MAINTENANCE

Intermediate level maintenance is carried out aboard submarine tenders while at designated submarine support facilities, naval weapon stations, naval magazines, and special weapons facilities. Maintenance is limited to the operations associated with periodic monitoring/replenishment of nitrogen in the missile, routine visual inspection, corrosion prevention tasks, replacement of electrical and pneumatic umbilicals, capsule security equipment (i.e., nose cover, slot covers, security plate), and replacement of the diaphragm. IMAs must conduct stray voltage and continuity checks as part of the warhead installation/extraction procedure on the UGM-109A variant. This procedure also requires the removal/replacement of the capsule diaphragm and partial decapsulation of the missile.

Designated submarine tenders that are used as deployable storage and weapons resupply ships for assigned submarines, provide the following capabilities:

1. Performs intermediate level maintenance and repair functions on all tactical missiles and support equipment
2. Performs Warheading of the UGM-109A-2 variant
3. Provides magazine storage of missiles for issue to submarines
4. Provides storage, issue, in-fleet recovery, and immediate postrun maintenance (limited to exterior surfaces) of Tomahawk test missiles (TOTEM)
5. Returns missile shipments to the TWF for recertification
6. Provides for limited dockside storage for shipping containers
7. Provides for the maintenance of support and test equipment and warhead training

Designated naval magazines (NAVMAGs)/ naval weapons stations (NWSs)/special weapons facilities (SWFs)/submarine support facilities (SSFs), or submarine bases (SUBASEs) used as storage and issue facilities for submarines and submarine tenders provide the following capabilities:

1. Performs intermediate level maintenance and repair functions on all tactical missiles and support equipment
2. Performs Warheading of the UGM-109A-2 variant
3. Provide magazine storage of missiles for issue to submarine
4. Stores, issues, and refurbish TOTEM
5. Returns missile shipment to the TWF for recertification
6. Provides storage for empty shipping containers
7. Provides for the maintenance of support and test equipment and warhead training

DEPOT LEVEL MAINTENANCE

Depot level maintenance is identified as those tasks beyond the intermediate level maintenance activity's capability. The refurbishment, repair, recertification of missiles, and other scheduled maintenance tasks are considered depot functions. Depot maintenance will be done by the contractor at the TWF. The TWF, besides issuing, recertifying, and maintaining tactical missiles, will issue and turnaround REM-equipped missiles. Handling shapes and TOTEM will have their major overhaul performed at designated depots.

SUPPORT PROGRAM

To implement the Tomahawk Cruise Missile System and sustain its operational readiness, support site training/certification, initial outfitting, distribution of technical documentation, coordination of technical fleet support, and interim support are required.

Fleet Technical Support

The AUR development, management, and technical cognizance are the responsibility of Cruise Missile Project (CMP). Configuration management will be accomplished by (CMP) throughout the service life of the weapon system. Fleet support may be obtained by contacting CMP Logistics (PDA14-41).

Naval Underwater Systems Center has been tasked to assist CMP in managing certain functions of the program through Material Support Data (MSD). Specific tasks include serving as Inservice Engineering Agent (ISEA) for

support and test equipment, providing evaluation of technical manuals, evaluating engineering changes to ensure maintenance of missile/capsule/missile tube interfaces and specified supply support functions.

Site Preparation/Activation

The commencement of Tomahawk cruise missile support functions at designated activities requires the accomplishment of a number of logistics tasks to ensure the availability of required resources. Principally, the extent of these requirements are determined by the scope and volume of support operations intended at the site. Surveys directed by CMP determine the extent to which available resources at the site can satisfy these requirements and help identify short falls. These shortfalls constitute the net logistics requirements for site activation and generally fall into the following areas:

1. Storage, transfer, and maintenance facilities
2. Tools and consumables
3. Support, test, and handling equipment
4. Technical documentation
5. Personnel
6. Training

The allocation of appropriate logistics resources to meet the shortfalls at any particular location is addressed in detail in the site activation plan for the specific site in question.

Initial Outfitting

The NUSC, as part of its ISEA function, provides initial outfitting of common tools, support equipment, handling equipment, consumables, and spare parts to designated submarines, submarine tenders, shore stations, and school facilities. This is initially reflected in appropriate AEL, APL, and subsequently in COSAL/COSBAL documents. Responsibility to request initial outfitting of SSNs depends upon when the system installation occurs. Generally, during new construction installation, NUSC coordinates and supplies materials to the shipyard that does the installation. Requests for initial outfitting during ROH is the responsibility of the fleet Integrated Logistics Overhaul (ILO) team. NUSC coordinates their efforts to provide initial outfitting with the ILO team to ensure that requisitions are not submitted through the supply system for outfitting material which NUSC provides. In all cases, however, NUSC is the supplier of the required materials based on AEL, APL, and applicable COSAL authorized allowances.

AUR Support

The AUR is supported as a depot level turnaround end item under joint cruise missile project (JCMP) contracts. Spare requirements for the AUR and its related support equipment at organizational and intermediate level are controlled by JCMP but they may task an interim support about to supply the material. Fleet maintenance is supported by NUSC.

Supply Support

The NSPCC has been assigned program support responsibilities for the Tomahawk weapon system.

Submarines off-load AURs to supporting AS tenders and shore facilities, who returns the AURs to the TWF for normal recertification or unscheduled maintenance, as applicable. A TMIS report, NAVSEA Form 8510/5, is required in the event of an unscheduled off-load. TOTEM refurbishment facilities will be established to support platform certification and training requirements. Tomahawk Fitment Shape (TOMFISH) is available for use by shipyards to certify submarine Tomahawk handling systems and torpedo tubes.

Nonstandard Support

Ship's supply personnel are responsible for unique Tomahawk spare parts. Special procedures for inventory control of those spare parts are required as part of the management of the items.

STOCK RECORDS.— Stock record cards containing part number and locator information must be maintained on the Tomahawk unique items in a file separate from the ship's stock.

REPAIR/REPLENISHMENT.— Items already in the federal supply service (FSS) should be requisitioned through supply channels and must be accounted for according to supply procedures. Tomahawk unique spare parts that are not in the FSS are requisitioned as follows:

1. Maintenance personnel must identify required replacement items as repairable or nonrepairable by applying normal internal ship

procedures. Item identification should include the following information:

a. End item
b. Part Number (Federal Supply Code for Manufacturer [FSCM])
c. Nomenclature
d. Repairable or nonrepairable
e. National Stock Number (NSN) (if assigned)
f. Quantity required
g. Date material required
h. Urgency of need

Note: Repair instructions, illustrated parts breakdown, and parts list are included in the appropriate equipment maintenance manuals. Part numbers may be identified in the APL Management Form as well.

2. A Storekeeper must determine if the unique item is aboard ship. If the required item is on board, the Storekeeper issues the part and recovers the failed unit. A Torpedo Maintenance Data form must be filled out by the originating maintenance facility and sent directly to NUSC. This should be the only direct contact organizational level and intermediate level maintenance activities have with NUSC. If a unique item was replaced from the ship's spares, the Storekeeper must requisition a replacement item using a DD Form 1348, to maintain the onboard allowance level.

REQUISITION DATA.— Spare or repair parts support is obtained by means of requisitions, DD Form 1348, being submitted to NSPCC or a Defense Logistics Agency (DLA) activity as appropriate. The National Stock Number (NSN) or the Navy Item Control Number (NICN) are used on the requisition to identify the items.

If an item listed on the AEL or APL is not on board for a required repair or replacement, the item should be requisitioned from NSC or DLA, as appropriate. If immediate repair or replacement is necessary to meet operational or training schedules, SPCC and NUSC should be notified by naval message. If the need for an item is extremely urgent, NUSC may be contacted by telephone. If the use of a phone is selected, the transaction must be confirmed by message. If the required part is not listed in the AEL or APL and a NSN or NICN is not available, contact NUSC directly and inform NSPCC.

Items that are nonrepairable at the intermediate level must be stored while awaiting disposition instructions. A Storekeeper must send a Torpedo Maintenance Data form to NUSC, who will in turn, determine disposition of the items and provide disposition instructions. The Storekeeper must then pack and ship or dispose of the items as instructed.

NUSC REQUISITION PROCESS.— To meet immediate operational or training schedule requirements for low cost NSN items (under $100.00 each), a naval message will be submitted in accordance with MILSTRIP/MILSTRAP and NAVSUP Pub 485 to the cognizant supply support activity as reflected in the Navy Maintenance Data List (NMDL); requirements for high cost NSN items (over $100.00 each) and non-NSN items will be submitted to NUSC in accordance with the above cited publications. The requisitioning activity will provide information copies to CMP (PDA14-41), NSPCC (code 05344), and NUSC (code 8313) as appropriate.

Related Equipments

Pressure servicing kits used to maintain and check the pressure of encapsulated missiles, pressure vacuum distributors used to purge and repressurize missile guidance cavities, and Mk 438 test sets are provided as contractor furnished equipment (CFE). NUSC provides spare supply support for these items until the supply support system becomes available.

CFE, such as the warhead installation trainer and removal stand, is also spare-supported by NUSC. When repair/replacement exceeds IMA/NUSC capability, NUSC must determine disposition of the items and negotiate a contract through the Joint Control Missile project (JCMP) with the with the contractor.

Pneumatic and electrical umbilicals are shipped inside a shipping container with a tactical AUR to a submarine by the issuing activity. Reuse of electrical umbilicals previously subjected to seawater is prohibited. Used electrical umbilicals, or any umbilical beyond repair capabilities, must be red tagged, stowed in a designated area, and off-loaded at the first opportunity to a servicing IMA. The IMA submits a Torpedo Maintenance Data form and holds the umbilicals pending disposition instructions. Used umbilicals are generally refurbished and used with TOTEMs. TOTEM umbilicals must be shipped via an I-level activity immediately after use to NUSC for

refurbishment. Unused umbilicals must be returned with the AUR to the contractor.

Nuclear Support

Nuclear support equipment and the necessary supply support are provided by NSPCC (code 8551) according to Special Weapons Operating Procedures (SWOP) 100 and NAVSOP 1500. This material is identified in COSAL's 95000 series. Requisitions for inert nuclear weapons material (8A) should be submitted to Code 900 at the Navy Supply Center, Oakland, California, or NSC Norfolk, as appropriate.

Disposition of Used/Damaged Material

Receipt of defective material from the federal stock system (FSS) is reported to Navy Fleet Material Support Office according to NAVSUP-INST 4440.120 and to NUSC with a Torpedo Maintenance Data form. The Torpedo Maintenance Data form is not to be submitted for common hardware items. Disposition instructions for defective, damaged, or saltwater-exposed components or equipment may be obtained by submitting a Torpedo Maintenance Data form.

DOCUMENTATION

Documents regulate all aspects of the Tomahawk vertical launch AUR system during its life cycle. These actions are taken to assure system reliability and have the provision for monitoring areas of the program for possible improvement. These documents fall into two broad categories:

1. Manuals and instructions that are primarily regulatory in nature, prescribing standard operating procedures relative to safety, security, accountability, and so forth, for all similar items in the Navy inventory.
2. Discrete system documentation and manuals are specifically written to support the Tomahawk vertical launch AUR system describing physical, functional, and operational characteristics as well as maintenance, handling, and operational readiness requirements. System manuals also serve as instructional tools.

The 3-M Systems is a dual-purpose system providing for scheduled maintenance through the PMS and data collection through the MDCS.

REPORTS

The TMIS conveys reports of maintenance activity at the user level to the cognizant activity for data collection. The Torpedo Maintenance Data Report is the vehicle used to convey reports of damaged, faulty, failed equipment, and ineffective documentation. For the Tomahawk missile, NUSC has the responsibility of maintaining and disseminating this information. If problems should arise with warheads or warhead missile interfaces, an Unsatisfactory Report (UR) must be submitted to Naval Ordnance Station, Indian Head Detachment, McAlester, Okla., in accordance with SWOP 5-8.

ATRs must be submitted to NSPCC info CMP, by fleet activities, per CINCLANT-FLTINST 8010.4, COMNAVLOGPACINST 8015.1, and NSPCCINST P8010.12. This data is collected by NSPCC for the purpose of inventory control and identification of current asset location to meet the requirements of CAIMS. CAIMS data are subsequently provided to the FLTAC Central Data Collection Agency according to a data exchange program.

A submarine launched Tomahawk missile must immediately be reported by a firing report.

RECORD BOOK

The purpose of the record book for Tomahawk cruise missile (JCMP PUB 4440) is fivefold:

1. It provides a record of both the modes of transportation and duration.
2. It provides a record of AUR handling.
3. It provides a record of all tests involving the AUR only.
4. It provides a history of maintenance and significant events.
5. It provides a record of any waivers/deviations to the technical manual acceptante/rejection criteria.

The record book must be kept current and must be returned with the weapon to the Tomahawk Weapons Facility at the time of recertification, unscheduled maintenance, or conversion.

Data from the record book is added to test data generated during recertification and other tests. The type of activity, date of receipt, and date of transfer must be noted in the record book. To associate conditions of transportation and storage with other data, the type of activity

Table 4-4.-MOSS System Scheduled Maintenance

FREQUENCY	MAINTENANCE ACTION
Weekly	Inspect the MOSS hold down straps and dual tray lashing straps for tightness. (The hold down straps are tightened by hand, dual tray lashing straps are torqued to 100 ± 5 foot-pounds.)
21 Days	Launcher inspection when stowed in a torpedo tube
21 Days	MOSS-loaded launcher inspection when stowed in a torpedo tube
Within 6 hours of tube draining	MOSS treatment following exposure to a flooded torpedo tube condition
Within 6 hours of tube draining	Launcher treatment following exposure to a flooded torpedo tube condition

having custody of the missile between recertifications must also be known.

Classified information is entered in the record book on pages 1 and 6 only. The record book becomes classified CONFIDENTIAL FRD (Formerly Restricted Data) when the first entry is made on page 6. When the warhead is installed and the missile is moved, an entry is made on page 1 and the data is classified CONFIDENTIAL FRD.

In a pocket in the back of the record book are green cover sheets. These sheets must be immediately removed and attached to the front and back covers once a classified entry is made in the record book. Appropriate data (serial number and configuration and recertification date) from the original covers must be entered on the new green cover sheets.

MOBILE SUBMARINE SIMULATOR (MOSS) SYSTEM MK 70 MOD 0

The Mobile Submarine Simulator System (MOSS) Mk 70 Mod 0 consists of the following subsystems: Mk 57 Mod 0 mobile submarine simulator, Mk 136 Mod 0 launcher, Mk 5 Mod 2 dual stow and load tray, and the Mk 348, Mod 1 fire control panel. MOSS system accessories consist of a loading pole, bridge assembly, dual-tray extenders (10- and 19-inch), exercise sections, synchronous clock extenders, warm cable and guard assembly (expendable), and batteries.

The MOSS system is offloaded from the submarine at the end of each routine deployment cycle. The vehicle, launcher, dual tray, loading pole and bridge are returned to the tender for checkout, maintenance and refurbishment prior to redeployment. MOSS vehicles are turned around in accordance with the procedures specified in SW570-A0-MMI-010/MK 70. As with the other weapons systems we have discussed, the MOSS has three levels of maintenance: organizational, intermediate, and depot. We will start our coverage with the organizational level.

ORGANIZATIONAL LEVEL MAINTENANCE

Organizational level maintenance for the vehicle, launcher, and dual tray entails replacement of the warm cable and A-cable as required. You should conduct a visual inspection with wiping down of the vehicle and launcher after immersion in water, and exterior cleaning of the dual tray. Onboard-fire-control-panel maintenance consists of fault isolation to the lamp, switch, circuit card, and module level, and replacement of faulty lamps, switches, and modules.

Scheduled maintenance of the MOSS system by organizational activities is shown in table 4-4.

Onboard maintenance is not required for the dual tray, loading pole, and bridge assembly. These items should be checked out after they are loaded aboard and prior to deployment.

The MOSS system is offloaded from the submarine for 90-day maintenance at the end of each routine deployment cycle. The vehicle, launcher, dual tray, loading pole, and bridge are returned to the supporting IMA for routine postdeployment checkout, maintenance, and refurbishment. In addition, periodic load testing and certification of the following items are required every 48 months:

1. Launcher
2. Launcher cover assembly
3. Dual tray
4. 10-inch extension
5. 19-inch extension
6. Loading pole assembly
7. Tail nut adapter
8. Sling Mk 111 Mod 0
9. Sling, MOSS handling
10. Sling, endless loop

INTERMEDIATE LEVEL MAINTENANCE

Scheduled maintenance of the MOSS system at intermediate level maintenance activities consists of postrange turnaround, postdeployment maintenance, and complete turnaround using the procedures outlined in NAVSEA OP 4336. The load testing and certification of the components listed in the previous paragraph must be conducted as part of the intermediate level maintenance.

Following each sea run, MOSS vehicles must be returned to a shore-based IMA for complete turnaround. This includes afterbody preparation, system tests, and preparation for reissue.

Postdeployment maintenance must be conducted every 90 days. MOSS system components (vehicle, launcher, dual tray, bridge, and loading pole) are routinely maintained by the issuing IMA (tender or shore-based) following each offload and deployment cycle. Postdeployment maintenance includes inspection of the vehicle for exterior damage, verification of vehicle readiness, removal and refurbishment of the battery, and preparation of the vehicle for tactical or exercise deployment. The launcher, dual tray, bridge, and loading tray are inspected for corrosion and damage, functionally tested, and certain parts are lubricated during postdeployment maintenance.

MOSS vehicles must be returned to a designated shore-based IMA for complete turnaround after 1 year of fleet service. Additionally the MOSS vehicles must be returned if any of the following conditions should apply:

1. Exposure to flooded tube condition
2. Failure to meet inspection and/or test requirements
3. After 2 years of continuous storage without deployment

The Mk 391 Mod 0 fire control panel is used aboard tenders, at shore-based IMAs, and at the repair depot for turnaround maintenance and system checkout of MOSS vehicles. This portable panel consists of the Mk 348 Mod 1 fire control panel housed within an external case with accompanying cables and external power supply for portable maintenance use.

The Mk 572 Mod 0 test set (fig. 4-11) is a single cabinet, dual-purpose test set, designed as a MOSS system and FIR test set. This test set is used at shore-based IMAs and repair depot facilities. It is composed of standard test equipment and a pair of panels designed especially for the MOSS system and FIR module testing. The test set must be certified annually. The rack-mounted commercial test equipment must be removed and calibrated according to standard calibration procedures for each device.

The Mk 608 Mod 0 launcher test set is a single-purpose test set designed to cycle the launcher, test launcher circuits and valves, and test for launcher circuit continuity. The launcher test set is intended to be used at repair depots, shore-based IMAs, and aboard submarine tenders.

Replacement of Modules

The MOSS consists of 12 FIR modules assembled into a torpedo-shaped vehicle. The FIR concept, prevalent in torpedo design, entails arrangement of assemblies within the simulator so that module assembly and removal can be done quickly with standard hand tools.

If, during testing, abnormal results are attained, fault isolation procedures contained in NAVSEA OP 4336 should be followed to eliminate the abnormal condition. If, onboard a submarine tender, fault isolation procedures fail to satisfactorily eliminate an abnormal condition, the entire MOSS vehicle, along with a complete

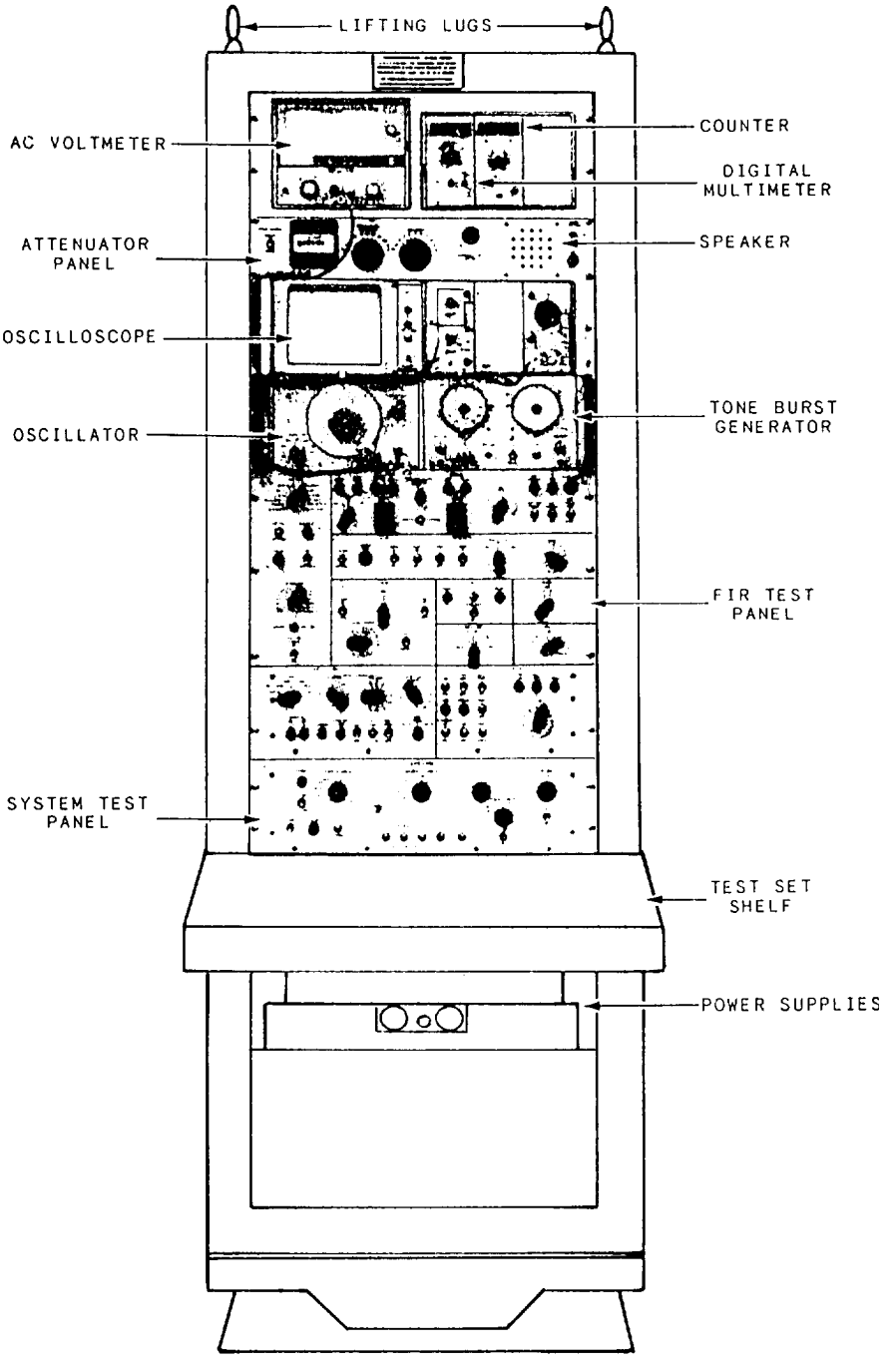


Figure 4-11.-Test Set Mk 572 Mod 0.

description of the failure symptoms, is returned to ashore-based IMA for detailed failure analysis, corrective action, and turnaround.

Throughout the conduct of fault isolation procedures contained in NAVSEA OP 4336, instructions to sequentially replace certain modules or parts are frequently used. Sequential replacement means that the following procedures are to be used.

1. Replace the first module or part on the list of items to be sequentially replaced with a new like item.
2. Restart the test at the last power-on step of the test.

3. If the originally failed test step is passed, stop and repeat the entire test.

4. If the test still fails, reinstall the module or part that was removed and replace the next module or part on the list of items to be sequentially replaced with a new like item.

5. Restart the test at the last power-on step. If the originally failed test step is passed, stop and repeat the entire test. If fault isolation procedures employed by a shore-based IMA fail to eliminate the problem, the complete MOSS vehicle assembly, along with a complete description of the failure symptoms, the sections of the fault isolation table that were followed, and the modules or parts replaced should be shipped to the MOSS depot repair activity.

DEPOT LEVEL MAINTENANCE

MOSS system components are returned to the designated depot repair activity as follows:

1. Vehicles—after 10 sea runs
2. Launchers—after 50 firings (total includes shop tests as well as at-sea launches)
3. All other components:
   a. After 5 years of service in IMA/fleet facilities
   b. Major item replacement or repair that cannot be accomplished at the IMA facility

The depot activity provides those services that cannot be routinely performed by the shore-based activities. These services include the following:

1. Major item and FIR repair
2. Static and dynamic seal replacement
3. Refurbishment of exterior/interior protective finish
4. Major item disassembly and replacement of parts

RECORDS AND REPORTS

Each vehicle and launcher is provided with an individual record book for recording maintenance actions, test data, and transfer and receipt information. The record book is maintained by the activities having custody of the hardware (vehicle and launcher). The record book must be forwarded with the equipment when it is transferred from activity to activity. Generally, the record book is packaged in watertight plastic bags and placed in the container with the unit. For a submarine loadout and offload, the record book is transferred by hand. When a vehicle is launched, the respective record book is forwarded to the issuing activity at the first opportunity.

The Torpedo Information Data form, is used by organizational and intermediate maintenance activities for MOSS system reports. At the organizational level, MOSS failures, maintenance actions, and RUDTORPE comments must be reported for the following equipment and publications:

1. MOSS Vehicle Mk 57
2. Launcher Mk 136
3. Fire Control Panel Mk 348
4. Dual Tray Mk 5
5. MOSS support/handling equipment, including loading pole and bridge assembly
6. NAVSEA OP 4336 (technical manual for MOSS Mk 70) and other documentation/procedures pertaining to items 1 through 5 above

A sample of a completed Torpedo Information Data form, being used to report a deficiency in the MOSS system is shown in figure 4-12. The REPORT TYPE block, block 3 is marked deficiency by the organizational maintenance activity.

The IMA may report failures, maintenance actions, configuration data, ORDALT, logistics actions, and informal RUDTORPE comments/recommendations using this form.

At IMAs, MOSS reporting is applicable to the following equipment/documentation items:

1. MOSS Vehicle Mk 57
2. Launcher Mk 136
3. Fire Control Panels Mk 348/391
4. Test Sets Mk 572/608
5. Dual Tray Mk 5
6. MOSS support/handling equipment including loading pole and bridge assembly
7. *Intermediate Maintenance Manual for FCP Mk 391,* NAVSEA SW 570-DO-MMI-010; NAVSEA OP 4336 (technical manual for MOSS Mk 70); NAVSEA SW 57O-AO-MMI-010, *Tender Maintenance and Handling Manual for MOSS Mk 70),* and other documentation/procedures pertaining to items 1 through 6 above.

TORPEDO MANAGEMENT INFORMATION SYSTEM
TORPEDO MAINTENANCE DATA FORM
(NAVSEA FORM 8510/5)

7 DOCUMENT NO

UNIT ID CODE (UIC)	ACTION JULIAN DATE	ACTION SEQ NO
0 5 1 3 3 M	2 0 9 7	0 0 8 3

SECTION I – IDENTIFICATION

1 ACTIVITY/SHIP NAME/HULL NUMBER: USS GRAYLING SSN 646 — Mark 70

SECTION II – DESCRIPTION

3. REPORT TYPE
- (1) ☐ MAINTENANCE
- (2) ☒ DEFICIENCY
- (3) ☐ ORDALT/CHANGE
- (4) ☐ LOGISTIC
- (5) ☐ RUNTORPE
- (6) ☐ OTHER (SPECIFY)

4. EQUIPMENT REPORTED ON
- (1) ☐ WEAPON/VEHICLE
- (2) ☒ TEST/SUPPORT EQUIPMENT
- (3) ☐ DOCUMENTATION/PROCEDURES
- (4) ☐ SPARES
- (5) ☐ OTHER(SPECIFY)

5. TYPE OF ACTION
- (1) ☐ WARSHOT TURNAROUND/VERIFICATION
- (2) ☐ PREPARATION/CONVERSION
- (3) ☐ SPECIAL RETURN ACTIONS

MK 46 ONLY — CLASS "A" ☐ "B" ☐

- (4) ☐ EXERCISE (POST FIRING) TURNAROUND

IF EXERCISE TURNAROUND ACTION, ENTER FIRING DATA BELOW

UIC | JULIAN

6. DEFICIENCY FOUND DURING

WEAPON/VEHICLE
- (1) ☒ RECEIPT/DAMAGE INSPECTION
- (2) ☐ DISASSEMBLY INSPECTION
- (3) ☐ COMPONENT TURNAROUND
- (4) ☐ COMPONENT/FIR TEST
- (5) ☐ INITIAL ASSEMBLY
- (6) ☐ SYSTEM TEST
- (7) ☐ FINAL ASSEMBLY
- (8) ☐ RUN ANALYSIS
- (9) ☐ OTHER (SPECIFY)

TEST EQUIPMENT
- (1) ☐ CALIBRATION
- (2) ☐ WEAPON/VEHICLE TEST
- (3) ☐ SELF TEST
- (4) ☐ VISUAL INSPECTION
- (5) ☐ FIR TEST
- (6) ☐ OTHER (SPECIFY)

7 WEAPON/VEHICLE/EQUIPMENT I.D	MK	MOD	REGISTER/SERIAL NO.	8 RUN NUMBER	S/R	9 TORPEDO NALC INCOMING	9 TORPEDO NALC OUTGOING	10 MOD	11 NEXT SCHEDULED MAINTENANCE
									CLASS "A" ☐ "B" ☐ ASLE ☐

12 TEST EQUIP ☐ USED ☐ DEFICIENT	MK	MOD	SER. NO	S/R	13 TEST DOC/PROCEDURE ☒ USED ☐ DEFICIENT	VOL	REV.	CHANGE	PARA/STEP
					OP 4336	1			

SECTION III – MATERIAL IDENTIFICATION/ACTION

14 ASSY/FIN ITEM/PART	DRAWING NUMBER AND REVISION	REFERENCE DESIGNATOR	SERIAL NUMBER	REPLACEMENT SERIAL NUMBER	15 ORDALT/CHANGE NO	16 M/I	17 S/R	18 P/D	19 ACCUTABLE	TEST TAPE AND REV	20 FILE CODE/ TEST STEP	BLOCK
WARM CABLE	3167622	04W1	NSN			R	S		3-4			
WARM CABLE	3167622	04W1	NSN			I						

21 NARRATIVE (1) DESCRIPTION (2) SHOP ACTION (3) RECOMMENDATIONS

(1) WARM CABLE FOUND TO BE CRACKED AT CONNECTOR.

(2) WARM CABLE REPLACED.

22 REC'D FROM (UIC)

SHIP TO (UIC) 0 0 2 5 3

23 MANHOUR/MATERIAL EXPENDITURES		24 REFERENCES/ENCLOSURES
MANHOURS	MATERIAL COST	
1/2		

25 NAME OF ORIGINATOR: TMI William Ferris Jr. USN

SUBMITTED DATE (JULIAN): 9 0 9 7

Figure 4-12.—Sample of a completed MOSS Deficiency Report.

- Maintenance Report. Routine preventive maintenance actions should be reported as follows :

  1. At the completion of an exercise vehicle turnaround by a shore-based IMA
  2. At the completion of a postdeployment tacticaI vehicle turnaround or launcher checkout by a tender or shore-based IMA
  3. At the completion of a rebuild/refurbishment/issue of any major MOSS hardware, including battery activation. Routine handling, visual inspections, exterior cleaning, and so forth, need not be reported; only nondeficiency maintenance resulting from normal use and handling must be reported as a maintenance report.

- ORDALT/Change Reports. These reports will include all ORDALT/Change installations performed on the MOSS vehicle and associated support, handling, and test equipment.

- Logistics Reports. These reports will include the receipt, issue, or transfer of a MOSS vehicle, or a MOSS component listed on the component identification sheets, or associated support, handling, and test equipment, or MOSS battery.

The component identification sheets from the Mk 57 MOSS record book are a major source of configuration information and means of tracking final assembly tests. They are used instead of requiring separate component listings and reporting. After a complete vehicle turnaround or major rebuild is performed, a copy of the component identification sheet from the record book must be submitted with the Torpedo Maintenance Data form.

Detailed instructions for completing the NAVSEA Form 8510/5 for MOSS system application by organizational maintenance activities are contained in technical document TW 510-AA-PRO-020/TMIS. At IMAs technical document TW 510-AA-PRO-030/TMIS applies.

SUMMARY

The ASROC, Harpoon, Tomahawk and the mobile submarine simulator (MOSS) with all of their complex systems require extensive maintenance. In order that this required maintenance be provided, maintenance has been organized into three levels— organizational, intermediate, and depot. Each level has its own defined maintenance tasks to be performed and its specific logistic support.

The technician's reporting responsibility and the various reports he used in his reporting were provided so that you could see examples of a Torpedo Maintenance Data form when used as a RUDTORPE, deficiency report or a combination report.

REFERENCES

ASROC Missile, SW180-AA-MMI-010/2963, Naval Sea Systems Command, Washington, D.C., 1990.

Encapsulated Harpoon, Maintenance and Stowage, SW820-AB-WHM-010, Naval Sea Systems Command, Washington, D.C., 1990.

Encapsulated Harpoon, SW820-AB-LOG-010, Naval Sea Systems Command, Washington, D.C., 1989.

Mobile Submarine Simulator Mk 70 Mod 0, SW570-AO-MMI-010, Naval Sea Systems Command, Washington, D.C., 1981.

Tomahawk Cruise Missile Logistics Support, SW820-AA-LOG-020/UGM-109-2, Naval Sea Systems Command, Washington, D.C., 1988.

Tomahawk Cruise Missile Maintenance, SW820-AA-MMO-010, Naval Sea Systems Command, Washington, D.C., 1987.

Torpedoman's Mate 1 & C, NAVEDTRA 10164-D, Naval Education and Training Program Development Center, Pensacola, Fla., 1984.

Torpedoman's Mate Third Class, NAVEDTRA 10168, Naval Education and Training Program Management Support Activity, Pensacola, Fla., 1989.